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DEPTH CLASSIFICATION

8. DOCUMENTATION WORK AND ABSTRACT CLASSIFICATION

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Examines the implications of the overwhelming proliferations in the universe of knowledge. Evaluates the versatility of a notation capable of implementing the concepts of phase, facet, round, level, and zone of array. Summarises the past work of FID/CA. States the notational problems arising out of the concept of zone in an array. Improves the application of subject device in an analytico-synthetic scheme of classification. Extends the idea of disjunctive incidence to all facets. Psychological and physiological limit to the number of digits in an isolate number is shown to coincide with number of relevant characteristics usually needed in a train of characteristics belonging to a facet. The capacity of the notational system of the current form of analytico-synthetic scheme of classification is estimated to be of the order of 10^{21} at documentation level. It is of the order of 10^8 at the level of book-classification. The concept of Abstract Classification is developed on the analogy of pure mathematics. The need for pursuing this discipline is shown to be a consequence of the depth classification needed for efficient documentation work. The problems needing immediate attention in depth classification are indicated.

1 PROLIFERATIONS OF UNIVERSE OF KNOWLEDGE

50,000 periodicals current. 2,000,000 articles on micro thought every year. Documentation has to face this today in natural sciences alone. Fifty years ago, the total of the dead as well as the current periodicals was only 10,000. The rate of production of documents has now increased ten-fold. The universe of socialised recorded knowledge has indeed become turbulently dynamic. Its proliferations are overwhelming.

11 Everywhere Apupa Pattern

The crucial problem in documentation is to organise millions of pieces of micro thought in a helpful sequence. The documents themselves should be arranged parallel to this sequence. So should the catalogue entries be. "Everywhere Apupa Pattern" is the term used to describe such a sequence in the Classification and communication (1951) of Ranganathan. At a particular moment, a reader is interested in a specific subject of slight extension and deep intension. That is his umbral spot in the universe of knowledge. He wants all the documents on it at one spot. This is his umbral spot in the sequence of documents. He also wants the entries of all these in one spot in the catalogue. On the right and left of it, he would like to have documents more or less related to his own umbral subject. As he moves away from the umbral spot, he wants to pass through subjects related to his own umbral one in a progressively diminishing degree. These are the two penumbral regions on the two sides of the umbral spot. These should gradually fade into alien regions. The subjects in these latter regions should have hardly any relation to his umbral subject. This is "apupa pattern" - alien, penumbral, umbral, penumbral and alien. Whichever spot is the starting umbral point, such an apupa pattern should persist. Then it is "everywhere apupa pattern". Classification should fan out subjects and documents into such an "everywhere apupa pattern".

12 Machinery for Search

The picking out of all relevant documents from millions of them is time-consuming. Even the picking out of their main entry cards is time-consuming. Electronic machinery is being designed to reduce the time for search of catalogue cards. To enable the machinery to make the search, each card or entry should be coded - perhaps on binary basis. The code number should represent, more or less uniquely the thought-content described in the entry. This binary code itself needs to be based on the class number of the micro thought embodied in the document. The binary code should indeed be a translation of the class number. Machinery can only speed up search. To make it search, classification should have already done its work. It should have individualised every specific subject. It should have thrown the subjects into an everywhere apupa pattern. Machinery cannot do this.

13 Versatility of Classification

To enable the class number to secure every where apupa pattern, the scheme of classification should be severely filiatory. For the scheme to be filiatory with the number of subjucts running to millions, each class number should be expressive. It should show, in its very structure, the incidence of each of the relevant characteristics of the subject represented by it. To become truly expressive, the notational system of classification should have great versatility. Versatility will help both analysis in the idea plane and synthesis in the notational plane.

14 Monolithic Class Number

Library classification was designed eighty years ago. The aim was to mechanise arrangement of books on shelf — that is, arrangement of macro thought. The colossal work of arranging millions of pieces of micro thought in an everywhere apupa pattern had not been anticipated as one of its objectives. A monolithic system of class numbers enumerated in a single schedule was all that was necessary. Some interpolation had to be provided for. The decimal fraction notation gave the versatility necessary for this purpose. Eighty years ago DC did the work splendidly. The enumerative DC with its monolithic class numbers was found to be adequate so long as the dominant mode of formation of classes in the universe of knowledge was dissection and denudation.

15 Emergence of Facet Idea

But by the turn of the present century, documents embodying descriptive thought —describing the incidence of some micro thought in a particular area at a particular time — tended to become rather numerous. They began to crowd out from visibility the documents embodying fundamental thought unconditioned by space and time. To separate the latter from the octopus of descriptive documents, it became necessary to attach space and time facets to the host subject. The latter had to be treated as the core. This was in the idea plane. In the notational plane, this demanded attachment of space and time isolate numbers to the host class number treated as core. UDC was the first to achieve this. As a result, UDC became somewhat analytico-synthetic. It introduced distinctive connecting symbols for space and time isolates. Instead of one enumerative schedule, it had three enumerative schedules. Instead of all its numbers being monolithic, some became tripartite. The core or host facet, space facet, and time facet were the three parts. This first experience of facet analysis encouraged UDC to improvise an energy facet for such of its DC core numbers as had not an energy element closely packed or bound within them. It improvised another connecting symbol for this energy facet. The energy isolate was called "special analytic division". A few dozens of energy facets were enumerated independently, the unsorted conglomerate of the so called form divisions were also enumerated separately. A special connecting symbol was designed for them also.

16 Emergence of CC

But the core or host number was made up of the closely bonded DC number. It had no versatility. It was monolithic. The host foci were enumerated in a single schedule. There number went into thousands before long. They could not keep step with the turbulent development coming into vogue in the universe of knowledge since World War I. New subjects — micro subjects — sprouted from great depths. They demanded filiatory places. Their number increased incessantly. Their force shattered the monolithic host numbers found in the long enumerated schedule. Many of them cracked. The host number itself had to be faceted in order to meet this situation. **Experience showed the need to separate out from many** of the scheduled main class numbers of UDC, the personality, matter and energy facets. These were found to lie cramped in the monolithic main class numbers, without freedom to proliferate and to receive the new micro subjects. Most of the main class numbers of UDC had to be replaced by multi-partite numbers. CC did this. As a result, CC became out-and-out analytico-synthetic. Its enumerated core contained only less than a hundred basic classes, instead of the thousands of UDC. The number of its enumerated schedules for facets went up to a few hundreds, instead of the few tens of UDC. Multi-partite class numbers dominated in CC as against monolithic class numbers dominating in UDC. The visible structure of CC number was expressive of the structure of the subject represented. The visible structure of UDC number was expressive of the perepheral structure only of the subject represented. Each one of the facets of a subject had a correlate facet or isolate number, distinctly recognisable in CC number. Only two or three facets of a subject had correlate facets or isolate numbers easily recognisable in UDC number. Each of the characteristics of a subject falling within a facet had a correlate digit in the isolate number in CC. This was not so in UDC. To this extent CC notation showed greater versatility than UDC notation. This was twenty-five years ago. That first draft of CC had removed rigidity to some extent.

17 Further Removal of Rigidity

But, the versatility of CC soon proved inadequate. It could not keep steps with the profuse proliferation put forth by the universe of knowledge during and since World War II. The first step taken to increase versatility was to compare the few hundreds of schedules for the diverse facets of each of the dozens of basic classes. This comparison led to a fruitful postulate. Each of the facets could be postulated to be a manifestation of one or other of five fundamental categories. These five categories were Time, Space, Energy (= action), Matter (= material), and Personality. The last is ineffable. The other four categories are its attributes. The basic facet itself was regarded as Super-Personality; for even personality was an attribute of it. Five was found to be a convenient number. It had no metaphysical or anthropomorphic basis. A distinct connecting symbol was designed for each fundamental category. This resulted in a further reduction of rigidity. This was in 1950. An account of it will be found in Colon classification and approach to documentation by Ranganathan forming part of Bibliographic organisation: Papers presented before thr Fifteenth Annual Conference of the Graduate Library School, July 24-29, 1950, edited J. H. Shera and Margaret E. Egan. Further embellishments followed. But the sequence of the facets gave trouble. This was set right by postulating a particular sequence for the fundamental categories. This gave a more or less helpful sequence of classes. To mechanise the arrangement of classes accordingly, the ordinal values of the connecting symbols for the fundamental category was fixed in a suitable way. Thus refitted, the notation of CC attained a high order of versatility.

18 Further Increase of Versatility

But even this much of versatility proved unequal to the profuse and minute proliferations developing in the universe of knowledge. The notation of CC developed till 1950 allowed only a maximum of seven facets. It was in reality only five effective facets. The other two were the basic and the amplifying facets. But many of the new micro subjects thrown forth by the universe of knowledge presented many more facets. This baffled documentation work. Then emerged the concept of "Level and Round". It was postulated that

1. Energy facet may recur two or more times;
2. Any energy isolate can start a new Round of personality, matter and energy facets;
3. In each round, personality facet can recur two or more times — these were called Levels of personality; and matter also can have Levels of facets;
4. Space facet can have Levels of facets;
5. Time facet can have Levels of facets; and
6. Space and time facets can occur only in the last round.

These postulates were made in the idea plane. It has been possible to implement them in the notational plane of CC, to a limited extent only. Whatever had been done till 1953 was summarised in Depth classification and reference service and reference materials : Papers for discussion at the Tenth All-India Library Conference, Hyderabad, 1-4 June 1953, ed by Ranganathan. Further work is being done in implementing these ides in CC more fully. Implementation, of these helpful postulates of the idea plane, in the notational system of UDC, totally awaits to be done. Potentially, the concept of level and round would increase the versatility of a notational system to infinity. Actually, the number of facets in a specific subject has not yet begun to exceed fifteen. Therefore, as re-inforced by the concept of level and round the versatility of CC is able to meet comfortably any intensity of proliferation occurring so far in the universe of knowledge.

2 EMERGENCE OF ANALYTICO-SYNTHETIC CLASSIFICATION

But the work of classifying a document cannot any longer be as with the monolithic DC. It can not be even as with the UDC with but a maximum of five facets. Translation of name of subject into class number cannot any longer be like looking up a bi-lingual dictionary for equivalent term in two languages. Index-approach cannot any longer be sufficient to classify micro thought. These were sufficient in a scheme with no facets or with a scheme having not more than three or four peripheral facets. But with a scheme capable of distinguishing fifteen or more facets, the work of classifying has to proceed on a different basis. A subject should first be analysed into its facets; this is work in the idea plane. The isolate idea in each facet should then be expressed — i e named — in the preferred standard terminology; this is work in the verbal plane. The isolate term should then be translated into isolate number with the aid of the schedule appropriate to the facet; this is work to be done before transition from the verbal plane to the notational plane. Finally, the basic number and the several isolate numbers should be synthesised into a multi-partite class number; this is work in the notational plane. This marks the emergence of analytico-synthetic classification in its fullness. It is hard to say how long the versatility of an analytico-synthetic classification will prove sufficient. It all depends on the probability for new happenings in the universe of knowledge — particularly the probability for new modes of formation of micro subjects. It is perhaps not too rash to conjecture that a fully analytico-synthetic classification can face up the cascade of new micro thought for a much longer time than an enumerative or a haltingly analytico-synthetic scheme. Considerable work remains to be done to exploit, in full measure, the potentialities of a fully analytico-synthetic scheme of classification. We shall first enumerate what has been done already. This will enable us to estimate what yet remains to be done. CC has re-conditioned itself more than any other scheme to analytico-synthetic work. Therefore, methods of exploiting a fully analytico-synthetic scheme of classification is best demonstrated in terms of CC. However, some of the results so got are capable of being implemented, to a more or less extent in UDC. The barrier occurs only when the analysis in the idea plane calls for a break-up of the rigid core of a main class holding many different facets within itself, in bondage and without freedom to proliferate. Such a barrier occurs often in UDC. All such cases should be carefully noted. Then it may be possible to evolve some method by which this barrier can be removed between the results of analysis of micro thought in the idea plane and their implementation in the notational plane of UDC.

21 Common Isolate

The first round of work on common isolates has been completed. By common isolate is meant an isolate whose isolate number represents the same term and the same idea, whatever be the host class to which it may be attached. The traditional schedule of common isolates was found to be a mixture of diverse categories. Attributes of the physique of document and of the form of exposition were found mixed up with attributes of thought-content. These were separated out into three groups in the idea plane. Each of these groups of categories needed classification on its own lines and independent of one another. Accordingly, in the notational plane the call number of a document was seen to be a bundle of three different groups of numbers — viz Collection Number, Book Number and Class Number. The categories in the traditional schedule of common isolates had to be distributed to these parts of a call number. CC had carried out this separation in 1952 in its edition 4. But it awaits to be done in UDC. The group belonging to class number alone should figure in the true schedule of common isolates. All this has been incorporated in Report 4 of FID/Ca "General theory of classification". This report forms document F 54 - 40 of 17 May 1954.

22 Approach Material

Even the filtered true schedule of common isolates was seen to be still a mixture. One group covered "approach materials". The Canon of Helpful Sequence pointed out the helpfulness of a host class with an approach facet attached to it coming before the bare host class. This was in the idea plane. The decimal fraction notation cannot implement this in the notational plane. CC postulated the Roman small letters to have anteriorsing quality, in order to implement it. BC implemented it by postulating the Arabic numerals to have anteriorising quality. Such a simple device was possible on account of CC and BC using a mixed notation to represent isolates. But except for the use of alphabetical device in a few specified cases, UDC used a pure notation for isolates. It could, however, implement the idea of approach materials coming before host materials by postulating the connecting symbol (O...) for approach facet to have anteriorising quality. This has been recommended to FID/CC and FID/CCC by the meeting of FID/CA held at Belgrade on 22 Sep 1954. These recommendations have been given in the form of six resolutions recorded in document FID-CA 2 of that date. Approach common isolate may be called anteriorising common isolate.

23 Posteriorising Common Isolate

After the separation of the anteriorising common isolates, there was a residue in the true schedule of common isolates. These residual common isolates were found to be of posteriorising quality in contradistinction to the anteriorising ones. In other words, the Canon of Helpful Sequence pointed out the helpfulness of a bare host class coming before the host class with a facet of a posteriorising common isolate attached to it. This was in the idea plane. To implement this in the notational plane, CC used a neat device. The posteriorising common isolates could be sorted out on the basis of the five fundamental categories. A separate schedule for each such group of posteriorising common isolates was drawn up. By attaching the appropriate connecting symbol, the resulting facet became a posteriorising facet. Roman small letters were used for the posteriorising common isolates. The ordinal value of z was postulated to be less than that of 1. This rationalisation led incidentally to a great enrichment of each of the schedules of posteriorising common isolates. This has been demonstrated in Report 4 of FID/CA mentioned in section 21. The notational system of UDC lends itself to a similar neat implementation of this idea only in the case of time and space isolates. In the case of energy, matter and personality isolates it has to invoke the aid of its colon device. This device is a do-all device. It gives clumsy, over-long class numbers. The need for a suitable change in the notational system of UDC is indicated by this near-breakdown.

3 FIRST ORDER ARRAY

The advantage of mixed notation is also seen in other ways. It makes the first order array of any facet more versatile than a pure notation. CC has postulated four species of digits for use as the first digit of an isolate number. These species are Roman small letters, Arabic numerals, excluding zero, Roman capitals and Greek letters. We have already seen to some extent the gain in versatility of the notation, due to the use of Roman small letters. The next few sections will demonstrate the further gain in versatility due to the mixed nature of the notation.

31 Array of Main Classes

The number of main classes has to be determined by the state of socialised recorded knowledge in any epoch. To use a useful concept of Wyndham Hume, the number of main classes depends on "Literary Warrant". Main classes represent the result of the dissection of the universe of knowledge just once. The characteristic used for this dissection is ineffable. Therefore the main classes are only canonical. In the earlier cultural epochs, only three or four main classes were indicated by literary warrant. In the Vedic epoch, there were four main classes. In the Greek epoch there were three. In the current epoch literary warrant justifies nearly two dozen main classes. But the pure notation of Arabic numerals of DC and UDC had to force them into ten groups. There was therefore unequal incidence of homogenity in the schedule of main classes. Again, a main class of an earlier epoch is usually a partial comprehension of the main classes of a later epoch. There are documents on it. Therefore each older main class also needs a place in the current schedule of main classes. This amounts to saying that the array of main classes should be a "telescoped array". The term "telescoped array" is used to emphasise that it contains foci of different orders. This is in the idea plane. In the notational plane, even the large base of Roman capitals proves too small to accommodate the main classes. CC has met the situation by using a mixed notation for the array of main classes. It uses Roman capitals, Greek letters, and Arabic numerals other than zero to represent main classes. Two Roman capitals and six Greek letters are used ro represent the partially comprehensive classes of the past demanded by literary warrant on account of there being documents answering their extension. The remaining Greek letters are available to represent desciplines with a status more or less of a main class of the current epoch. Three Greek letters have been used in this way till now. Main classes do not get formed frequently. And there are still quite a number unused Greek letters to accommodate new main classes for quite a long time. A new species of main classes is gaining literary warrant in our own days. These have been called "prels". A detailed account of them are given in the Depth Classification already mentioned in section 18. By now, we have had enough experience of a pure notation confined to a single conventional species of symbols getting overpowered even at the first stage of dissection of the universe of knowledge.

32 First Order Array of a Facet

There is a first order array in each facet. A facet really amounts to a sub-universe of the attributes of a basic class belonging to or capable of being viewed as manifestation of one of the five fundamental categories. Each such sub-universe can be dissected. The isolates resulting from the first dissection form the first order array. Generally speaking the isolates of first order array of a facet fall into four groups:--

1 Posteriorising common isolates;
2 Special isolates based on an essential characteristic;
3 Special isolates based on an accidental characteristic, such as year of occurrence or name in verbal plane; and
4 Residual isolates not admitting of being put into any of the first three groups.

Thus, four zones are recognisable in the first order array of a facet:-

1 Zone of common isolates;
2 Zone of essential special characteristics;
3 Zone of accidental special characteristics; and
4 Zone of residual isolates.

This is in the idea plane. It will be helpful if the notational plane can reflect this. It will be a convenience if the notation begins with a digit of different species in the different zones of the first order array of a facet.

33 Zone of Common Isolates

Moreover, to conform to the concept "common", each isolate in the zone of common isolates should be the same whatever be the host class. We have seen in section 23 that CC secures conformity to this concept by using Roman small letters as first digits of common isolate numbers. The isolate number of no other zone begins with a Roman small letter. We have seen in the same section that UDC marks off the zone of common isolates from the other zones by the distinctive connecting symbol (O...). Picking and assembling all common isolates is a continuing process.

34 Zone of Essential Special Characteristics

CC has certain postulates to make the isolate numbers of the zone of essential special characteristics distinguishable from those of the other zones. The digit nine is not generally used to represent an isolate. It is used only as an octavising digit. It is not a significant digit. The ultimate postulate is this: The first significant digit of an isolate number belonging to the zone of essential special characteristics should be an Arabic numeral. The first significant digit of no other zone is an Arabic numeral. The correlate of this in UDC is somewhat different. (0...) the connecting symbol is used as the means to mark off the zone of common isolates from the zone under consideration in this section.

35 Zone of Accidental Special Characteristics

CC has another postulate. It makes the first significant digit of an isolate number, based on year of occurrence as accidental special characteristic, a capital letter. If the isolate number needs additional digits for representation of the isolate idea these additional digits will be Arabic numerals. Similarly, when the isolate number is based on the name as accidental special characteristic, the first digit will be a capital letter. The succeeding digits will also be capital letters. Thus, in either case the first significant digit of an isolate number in the zone of accidental special characteristic is always a capital letter. It is easily distinguishable as the isolate number of no other zone begins with a capital letter as its significant digit.

In UDC, this is secured by two postulates:-

1 An isolate number based on the accidental characteristic of the year is distinguishable from the other's by its special connecting symbols of quotation marks; and

2 An isolate number based on the accidental characteristic of name begins with a Roman capital. No other isolate number begins with it However, all these kinds of isolates are seldom brought into a single array. Thus the versatility arising out of zones in array is missed. Work awaits to be done in UDC to utilise the versatility of zoning the first order array of a facet, consciously, systematically and effectively.

36 Zone of Residual Isolates

Occasionally an isolate crops up in an array defying accommodation in any of the three zones considered above. It does not admit of being represented in the notational plane by alphabetical or chronological device. Moreover, the measure of incidence on it of a characteristic cannot be stated except in terms of a subject. This is in the idea plane. In the notational plane it calls for its isolate number to be constructed by subject device. This implies that it is a common isolate. And yet it does not admit of being enumerated in the zone of common isolates described in section 33. At any rate it is not found so enumerated. Subject device is resorted to as the last recourse. At any rate it has to be applied in a sufficient number of cases before the possibility of finding a place for it in the zone of enumerated common isolates. An isolate number constructed by subject device will have many digits. It may also include connecting symbols of its own. Indeed it will be a regular class number in form. To use it on a par with a single-digited isolate number or a monolithic one, it should be made to look like a unit. Many unsatisfactory expedients were used by CC to secure this. The struggle went on for nearly thirty years. It was only a few months ago that a discussion in the Classification Research Circle in London led to a final decision to enclose the class number concerned, in brackets for this purpose. To implement this decision, the ordinal value of brackets should be determined. This will depend upon the position to be given to the zone of residual isolates among the other three zones of the array. This position will have to be decided in the idea plane. Here are the relevant considerations in that plane. As already stated, the use of subject device to fill up the zone of residual isolates makes it a zone of common isolates. For the isolate term and the isolate idea represented by the isolate number got by subject device will be the same whatever be the host class. Therefore, it may be appropriate to locate this zone immediately after the first zone. This is in the idea plane. To implement this in the notational plane, the ordinal value of brackets should be postulated to lie between z and 1. Thus we have the two common isolate zones first.

37 Look of an Array

Thus, the first order array of a facet presents four distinguishable zones. The first two of them are common isolate zones, the last two special isolate zones. This is in the idea plane. In the notational plane CC is able to implement it without much difficulty. The notation of UDC is not versatile enough to implement it. Some work needs to be done to secure for it the necessary versatility.

4 INTEGRAL VERSUS DISJUNCTIVE

41 Idea Plane

The focus in a facet of a subject may not be sharp enough to be clearly distinguished as an isolate idea. It may be diffuse. It may even be totally absent. The isolates in the facet may then be taken to be indistinguishable or undifferentiated. It may be taken to be a case of integral incidence of the isolates. The facet itself may be taken to be treated integrally in the document. An integrally treated facet may be treated as it were absent. There is another possibility. The isolates in the facet may be treated disjunctively. In other words, the document may contain distinct chapters or sections on each or at least several of the isolates. This is not a case of absence or diffusion. This is a case of multiple comprehension. This is in the idea plane.

42 Notational Plane

Till about ten years ago, CC was treating even a disjunctive facet in the notational plane, as if it were an absent facet. In 1942, Library classification : Fundamentals and procedure stated in despair that no notational device could be found to distinguish between disjunctive incidence and absence of a facet. In 1948, the symbol -1 was improvised to denote disjunctive incidence. It was, however, used only in space facet, where integral incidence is shown by the isolate number 1, and not be absence of isolate or facet. It took some years to see the possibility of extending this simple notational device even to a facet denoting integral incidences by absence of facet and not by digit. It was only in 1954 that this extension was made. This extension was suggested in section 63 "Multi-foculness" of Depth classification (6) of Ranganathan (published in the Annals of library science, 1, 1954, 193-201).

43 Solution of Unsolved Problem

Disjunctive incidence itself is thereby made an isolate in the facet. It is obviously a quasi isolate. It is more extensive than an individual isolate. It should therefore come earlier than any individual isolate- common or special. In the notational plane this leads to the postulate that the ordinal value of the connecting symbol hyphen - should be less than that of the first anteriorising common isolate digit a. This is a very important decision. Without the aid of the criterion of disjunctive incidence now emphasised in the idea plane, it has not been possible till now to determine on any rational ground the relative ordinal values of lower case letters and connecting symbols. Indeed, the connecting symbols were arbitrarily taken to lie between lower case letters and Arabic numerals. But we have now seen that the ordinal values of lower case letters should lie between those of connecting symbols and of Arabic numerals.

5 NUMBER OF DIGITS IN ISOLATE NUMBER

51 Needs of Psychology and Physiology

In an enumerative scheme with monolithic class number, the number of digits in the class number of micro thought necessarily increases to a high figure. It goes beyond what can be held in mind with comfort. It also goes beyond what can be uttered in a single breath with comfort. It further goes beyond a comfortable single sweep of the eye. There is no break on which the mind and the eye can rest, or at which breath can be taken. UDC recognises these psychological factors. It breaks up the monolithic DC number, forming its core, into three-digited groups by inserting a dot. This dot is a mere dummy. It has no semantic value whatever. On the other hand, in a faceted number of CC, there are breaks at comfortable intervals. The ideal is to have a break after each group of three digits as sensed by UDC. Three may be taken to be the optimum number of digits in an isolate number. Perhaps, six may be taken to be more or less the maximum that may be tolerated occasionally. In CC, the punctuation mark used to separate such breath-groups of digits are not mere dummies. They have semantic value. Each of them has also a unique ordinal value.

52 Number of Characteristics in a Train

Happenings in the idea plane appear to fit in with these needs of psychology and physiology in the notational plane. Facet analysis, based on the postulate of fundamental categories, rounds, and levels, throws the characteristics into a number of distinct trains. An examination of the various facets enumerated in CC shows that the optimum number of relevant characteristics available in a train of them is three. The maximum is more or less six. Any further relevant characteristic takes us to a new level of the same fundamental category or to some other fundamental category. For example in relation to the fundamental category Personality, we step from a Whole to an Organ or to a Constituent. This means that we step from one level of personality to another, or from Personality to Matter. In relation to Space, we step from the normal territorial divisions forming the first level to local or physiographical formations forming the second level. Again, in relation to Time, we step from public Time forming the first level to private Time forming the second. In Energy, the isolate number has only one digit in most cases. It may have two or three at most when group notation becomes necessary in order to accommodate more than twenty-four isolates in the first octaves. We have not had sufficient experinece with matter isolates. Perhaps they too will be similar. However, Space isolate belonging to territorial divisions, may call for more than six characteristics, viz, political and administrative at different degrees of intension. But socialised recorded knowledge seldom has so many characteristics in space facet. When it does, it is often only in a local collection. The Canon of Local Variation comes to our rescue in such cases. A number of digits at the beginning of an isolate number -- equal to the excess over the optimum three or the maximum six -- gets replaced by a single digit. In CC, it may be 2 or 3. Even in other facets, such oft-recurring groups of digits in the class number of a local collection are replaced by a hyphen. This coincidence, of the limits of psychology in the notational plane and of the characteristics in a train, is a happy one. An analytico-synthetic scheme of classification utilises this happy coincidence to a great extent

53 Octave versus Group Notation

The Law of Parsimony has a message to the formation of isolate numbers in the zone of essential specific isolates in an array. The isolate number can be formed by the device of ther octave notation or group notation. In Optional facets (11) by Ranganathan published in the Annals part of the Abgila, 2, 1952, 249, 24 has been shown to be the critical number to determine the preference between these two kinds of notation. If the number of isolates in the zone is greater than twenty four, group notation should be preferred. Otherwise, octave notation should be preferred. With octave notation, twenty four isolates can be accommodated. With group notation, 512 isolates can be accommodated. This is with 3 as the optimum number of digits in an isolate number. With six digits as the maximum number, 48 isolates can be accommodated in octave notation. And two, 262, 144 isolates can be accommodated in group notation.

54 Capacity for Macro thought

In the universe of macro thought embodied in books, we seldom have need for more than 5 facets. Taking the optimum number 3 for the number of digits in an isolate number, we can individualise 24^5 or in round figures 200, 000, 000 subjects in the zone of essential special characteristics alone. By utilising the zones of common isolates also we can individualise subjects to the order of 10^8. This is in relation to octave notation. With group notation we can individualise subjects to the order of 10^{14}. This is a measure of the capacity of a strictly analytico-synthetic scheme of classification such as CC.

55 Alternative First Characteristics

We have stated in section 52 that with any characteristic chosen as the first of a train, the number of relevant characteristics available to be chosen thereafter is seldom two and practically never more than five. However, the number of relevant characteristics available to be chosen as the first characteristic is often many. CC has adopted a convention is dealing with this situation. It chooses one of the possible first characteristics as the favoured first characteristic. The first octave is reserved for the isolates based on it. The second octave is reserved to accommodate the non-favoured first characteristics. Each of the isolates in th the second octave represents a characteristic itself and not a division based on it. Such an array has been called a mixed array. A full discussion of this convention will be found in Depth classification 6 of Ranganathan published in Annals of Library science, 1954, 1, 193-201.

56 Micro Thought

For documentation work in the universe of micro thought, the capacity is increased more considerably by adding more facets. Till now, we have come across micro subjects with as many as fifteen facets. With fifteen facets and with three as the number of digits in an isolate number, the number of micro subjects that can be individualised is roughly of the order of 10^{14}. With six as the number of digits in an isolate number the number of micro subjects that can be individualised is of the order of 10^{21}. This is a measure of the capacity of a strictly analytico-synthetic scheme of classification such as CC, when applied to documentation work.

57 Immediate Future

Thus, with an analytico-synthetic scheme of classification and the use of a system of seminal mnemonics for the substantive digits used in the notation of the scheme, it will be possible for library classification to face the challenge of the universe of knowledge for many decades, if its dynamical turbulence is not characterised by any mode of development different from the ones known hitherto.

58 Distant Future

But nobody can risk any prophecy about the potentiality of the Universe of Knowledge. New modes of its development can be set up by human intellect. Then, it will assume a new type of structure. In relation to it, the complex structure envisaged by CC may look as primitive as the monolithic structure envisaged by DC looks in relation tothe analytico-synthetic structure envisaged by CC. But till such a new and now unthinkable revolutionary mode of development is brought into use in the universe of knowledge, and analytico-synthetic scheme of classification may be enduring.

6 EMERGENCE OF ABSTRACT CLASSIFICATION

The separation of work in the idea plane and that in the notational plane, the institution of analysis in the former and synthesis in the latter and the postulate of fundamental categories, facets, levels, rounds, and zones in both the planes, have given us a glimpse of the discipline of Abstract Classification.

61 Analogy with Mathematics

The relation of abstract classification to library classification is similar to that of pure mathematics to physics. Mathematics provides a variety of models. Our knowledge of the external world can be correlated to one or other of these models. In other words, one or other of them is a close fitting description of our knowledge of the external world than can be fitted into the preferred model. Then, we choose a more closely fitting model. Such a new model may describe the old knowledge and the new knowledge at once. Our description of the knowledge of the external world progresses step by step. The first model turns out to be a first approximation in the coverage of the external world. The second model turns out to be a second and closer approximation. As our knowledge progresses, pure mathematics is ready with a model of greater coverage — i e of closer approximation. At every step, the new model contains the old one as a part of itself. This is of the essence of the models of pure mathematics. No model need to be thrown away altogether. Every model has its use for ever. In course of time, it merely turns out to be a part of a larger model, without any change in its own distinctive field of use. We now realise that the model provided by pure mathematics can fit not only the physical world but also the biological and social world. The model can be developed irrespective of the world to which it can be applied.

62 Model in Abstract

The progress made so far in the general theory of library classification, makes us sense the existence of a theory of abstract classification, analogous to pure mathematics. Abstract classification provides a model -- both in idea and notational planes --irrespective of any particular state of development and structure of the universe of knowledge. The model is also irrespective of any particular subject or region in the universe of knowledge. It is indeed a pure model. It is a model in abstract. When we take up a subject for classification, we relate whatever is known in its scheme to the model provided by abstract classification. This model is like a mould. We pour the recorded knowledge of a subject into this mould. Then, the schedules for the subject take shape with their distinctive isolate terms and isolate numbers. Later on we come to know more of the subject; more knowledge is recorded. Then some of the hitherto unfilled nitches in the mould get filled up. Some of the unoccupied places in an array get occupied. Or some new array gets filled up. Or some further links of a chain get occupied. Or some new chain gets filled up. Or a new facet gets occupied. All this is in the exact measure of what comes to be known and recorded from time to time. All these new items in the schedules of the subject come in without disturbing the old items. Every new proliferation in the subject finds a nitch in the mould in abstract, provided by abstract classification.

63 Second Analogy

We have several algebras. We have several geometries. These differ from one another in their postulates. They provide different models in abstract. To represent the external world in their terms, we choose just the one whose postulates hold good in the external world that has come to our knowledge. Sometimes it happens that the external world enriched by new knowledge does not admit of these postulates. Or some new postulates are indicated. Then we look to mathematics for a new algebra or a new geometry whose postulates hold good in the newly known external world.

64 Alternative Models

The second analogy described above holds good in abstract classification.

65 Nineteenth Century

The socialised recorded knowledge of the nineteenth century, sought to be served by library through classification and catalogue, consisted in effect of macro thought embodied in books. Its development was largely by the mode of dissection and denudation. The postulate of enumeration of classes -- ready-made-classes proved sufficient in the idea plane. The postulates of decimal fraction notation and of octave notation proved sufficient in the notational plane. A monolithic system of class numbers proved sufficient in the scheme of classification. To classify was only to pick up the appropriate class number from among a single schedule of class numbers.

66 Twentieth Century

But today, social pressure has made it imperative that micro thought, embodied not in physically separated documents but sharing the same physical unit of document along with many other units of micro thought, should be located and served to busy specialist, administrators and ministers in governments, expeditiously and exhaustively. Moreover such micro thought shows many more proliferations than macro thought. Its mode of development consists also of lamination and loose assemblage. The postulates of the five fundamental categories, levels, rounds, zones of arrays. telescoped arrays and mixed arrays are all necessary. The process of enumeration has to be restricted to facets. It can no longer be attempted for the class numbers themselves. This is in the idea plane. In the notational plane, facet notation, phase notation, a variety of connecting symbols, a mixed system of substantive symbols, and specialisation in their use have to be postulated. Polylithic class number has become necessary. To classify a document is to act in succession. It is

1 to analyse the thought-content of the document into ultimate ideas in the idea plane;
2 to translate each of the isolate terms denoting the isolate ideas into its isolate numbers with the aid of the many independent schedules given in the scheme; and
3 to synthesise the isolate numbers into a single polylithic class number in the notational plane.

In other words, pure enumerating models have to be abandoned. Analytico-synthetic models have to be used.

7 FUTURE WORK ON ABSTRACT CLASSIFICATION

If an analytico-synthetic scheme can also serve the purposes of an enumerative scheme with equal efficiency, it will no doubt be an advantage. We have found that this can be so. Apart from this, work, during the last ten years, on analytico-synthetic schemes with polylithic class numbers, such as UDC and CC, has helped in laying the foundations of a theory of abstract classification. It should be founded on stated postulates. Some of these should pertain to the idea plane. Some should pertain to the notational plane. Some others should pertain to the process of stepping from one of these planes into the other in correct register.

71 Idea Plane

The work of FID/CA -- the FID Committee on the General Theory of Classification -- has been till now based on a certain set of postulates in the idea plane. They have been helpful in providing suitable models in abstract; but they are not sufficient to meet new micro thought getting recorded from time to time. Their insufficiency is felt in regard to

1 levels in matter facet even in the first round;
2 levels in personality facet in the second and later rounds; and
3 the modulation of energy isolates, which mark off one round from another.

Even in the first round, the resolving power to be used in stepping from one level of personality to the next has to depend more or less on flair. No doubt, indoctrination may make all do alike. But guidance by an objective, impersonal, principle is desirable. To arrive at such a principle, the concept of resolving power, postulated first by S Ramabhadran, needs further pursuit.

72 Notational Plane

The necessity of mixed notation to cope with the demand of the depth classification needed in documentation work has been demonstrated beyond doubt. The need, for exploiting the freedom we have in postulating new ordinal numbers, has been shown. The advantage of a class number being co-extensive with the subject classified has been seen. Expressiveness of class number has also been seen to be a help. But the last two qualities cannot be had in the notation, unless the Canon of Relativity is postulated. This canon leads to as many as thirty digits in the class number of an occational document, because its thought-content has many proliferations. A comparative study of UDC and CC numbers shows that, by a judicious choice of the base for the substantive and connecting symbols, the length of class number can -- in the average -- be reduced to nearly a half. Even then, the length of class number persists in the depth-classification needed in documentation work. Here is a conjecture. Some Method of Condensation should be designed to reduce the length of class number without loss of co-extensiveness or expressiveness. The use of hyphen in accordance with the Canon of Local Variation is a trivial example of the method of condensation. The letters of the Sanskrit alphabet have some capacity for condensation. What the effective Method of Condensation will consist of it is now difficult to conjecture. But practice of documentation will surely lead to its design. For, necessity is the mother of invention. But, this mother will be denied the chance to help us, if we capitulate in the idea plane either by the total abandonment of classification of by resort to "broad subject headings", or by the abandonment of the idea of co-extensive and expressive class number. Let us not play Dunkirk, let us not hide our present state of defeat in this matter. Let us keep it always visible. Let it irritate us at every turn. Let us not in despair sacrifice or ignore the findings in the idea plane, because we face defeat in the notational plane. We shall one day or other succeed in the notational plane also. To trail a new path of success, we must engage ourselves in the pursuit of Abstract Classification. Sometimes the pressure of need in day-to-day classification will produce new results in abstract classification. Sometimes, abstract classification will forge ahead of actual needs. The analogy of pure mathematics suggests all these possibilities. The more penetrating results of abstract classification will enable us to meet new needs appearing round the corner in the universe of knowledge. The penetrating results of abstract classification may even make us see some current needs, which we tacitly overlook because we are inhibited by the tyranny of our habit of working with inadequate class numbers. The message of abstract classification is "Walk on earth. But be guided by the unreachable stars. One day we may have to walk on stars too".

DEPTH CLASSIFICATION

9. AGRICULTURE. 5. SPECIES AND CULTIVAR*

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The essential difference between taxonomic classification in botany and the classification in agriculture is brought out. The number of agricultural species and cultivars is estimated in the idea plane. The advantage in the verbal plane of the nomenclature recommended by the International Horticultural Congress is indicated. Out of the 90 possible utility cum organ numbers of plants only 52 are shown to have agricultural plants. The number of cultivable agriculutral species is estimated to be large. By a systematic analysis in the notational plane, prescriptions are made for the economic construction of species numbers, and of the economic cultivars. The advantage of arabic notation for species number and alphabetical notation for cultivar numbers is brought out.

0 INTRODUCTION

The last article in the series was on 'Species, Variety, Strain'. This was published in December 1953. Since then, we have received a copy of the International code of nomenclature for cultivated plants (1953). This code was adopted at the International Horticultural Congress, 1953, 13. The absence of such a standard code had been responsible for some of the difficulties met with in the last article of this series. The conclusions arrived at in the idea plane in terms of the new code will be stated first. Then the notational plane will be examined.

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* *Continued from Annals part of Abgila 3, 1953, 163.*

1 IDEA PLANE

11 Taxonomic Division

The name of a cultivated plant is usually three worded.

e.g. Oryza sativa 'Sirumanian'
Oryza glabberima 'Simoun'
Zea Mays 'Min. 502'
Solanum tuberosum 'Field Marshall'
Solanum melongena 'Serpentinum'
Prunus domestica 'Victoria'

The function and denotation of each of the three words in each of the above names are shown below.

Serial No	Word	Taxonomic division
1	Oryza	Genus
	Satina	Species
	'Sirumanian	Cultivar
2	Oryza	Genus
	glabberima	Species
	'Simoun'	Cultivar
3	Zea	Genus
	Mays	Species
	'Min. 502'	Cultivar
4	Solanum	Genus
	tuberosum	Species
	'Field Marshall'	Cultivar
5	Solanum	Genus
	melongena	Species
	'Pusa Purple'	Cultivar
6	Prunus	Genus
	domestica	Species
	'Victoria'	Cultivar

12 Genus

Botanically considered, agricultural plants belong to one or the other of a few hundreds of genera.

Scheme	Approximate number of genera covered in the schedule of Agricultural plants
CC	471
UDC	323 (In a few other cases families only are mentioned)

13 Species

In most cases, each genus contributes only one or a few species to agricultural plants. But in some others each genus contributes a large number. A few such genera are shown below with the approximate number of agricultural plants comprised in them.

CC No.	Name of Utility cum Organ isolate	UDC No	Genus	No. cultivated species (Approximate)
16	Ornamental Flower	593	Rhododendron	322
16	"	"	Rosa	125
16	"	"	Tulipa	90
16	"	"	Lilium	80
33	Food-root	51	Daucus	1
37	Food-fruit	4 56	Citrus	11
37	"	"	Musa	4
38	Food-seed	31 56	Triticum	13
38	"	"	Zea	1

The different species in a genus are distinguished from one another on the basis of certain characters. These are not as significant as the characters forming the basis of distinguishing the genera. A species is a more or less homogeneous taxonomic division. A botanical classification therefore usually stops with the enumeration of species. In other words, species is, as it were, the ultimate taxonomic unit. This is only a general observation. For, occasionally, varieties are also mentioned in botanical classification. But hardly any scheme of Library Classification for Botany has gone beyond the taxonomic stage of 'family'.

14 Variety

The varieties in a species are distinguished from one another on the basis of readily visible minor morphological characters. In the past, the term 'variety' was applied both to wild and agricultural plants - in other words, both to botanical variety and to cultivated variety. But at the International Horticultural Congress, 1952, 13, it has been decided to confine the use of the term 'variety' only to botanical variety.

15 Cultivar

An agricultural variety is now denoted by the term 'cultivar'. A cultivar in a species is a highly selected plant. Some particular character of it has been intensified in the process of plant breeding. Cultivar originates in agriculture. It is maintained only in agriculture. It is not of much interest to a botanist. Its name is not given in Latin. The term cultivar has now replaced a number of past designations such as type, strain, variety, clone, the German 'sorte' and the Scandinavian 'sort'. The basis of distinguishing cultivars is some highly economic characters such as disease resistance, drought resistance, high yield, cooking quality, long lint etc. These characters are too subtle either to be stable or to be of interest to a botanist. However these are of the very essence in agricultural classification. For; agriculture is concerned with the breeding of highly economic cultivars.

2 CLASSIFICATION

The line of pursuit of the study of plants in botany is different from that of the same in agriculture. Therefore the relevant characteristics for the classification of Plants are different in these two main classes.

21 Botany

In botany, classification of plants proceeds along taxonomic lines from beginning to end. The successive groups arranged in the sequence of decreasing extension are division, class, order, family, genus, species, variety and individual.

211 Illustration 1

The stages of reaching the agricultural plant 'rice' in botanical classification are:

Taxonomic division	CC No.	Name	UDC. No.
Division	5	Phanerogamia	24
Class	7	Monocotyledon	252
Order	78	Glumifloral	2542
Family	786	Gramineae	25421
Genus		Oryza (Rice) sativa (a commonly cultivated species of rice)	

The botanical schedule of CC as well as UDC stops with the stage of family. It does not reach even the stage of genus. This is natural; for, hardly any botanical document will exclusively be on the genus oryza. It needs no saying that it is even less so in regard to the species sativa.

212 Illustration 2

Taxonomic division	CC. No.	Name	UDC. No.
Division	5	Phanerogamia	24
Class	8	Dicotyledon	261
Order	852	Polemoniales	294
Family	8526	Solonaceae	29514
Genus		Solanum	
Species 1		tuberosum (Potato)	
Species 2		melongena (Brinjal)	

Unlike in the case of rice, the genus solanum has no vernacular name. In the species mentioned in the above table, the organ harvested for use is different. In potato plant the organ of primary use is the underground stem tuber popularly colled root. The corresponding organ in the brinjal plant is the fruit. In botanical classification these two plants will occur as coordinate isolates in the same array. But in agricultural classification they will occur in different arrays on account of the organ of primary utility being different. This demonstrates the incompatibility of the schemes of classification for these two subjects.

22 Agriculture

In agriculture, classification of plants is based on economic use. The first stage of classification is based on the dominant utility of the plant. The second stage of classification is based on the organ of dominant utility. The third stage of classification is based on the botanical species of the agricultural plant. The number of species giving agricultural plants is several hundreds.

220 Number of isolates

UDC has not given a schedule of utility isolates. CC has given the following 10 isolates.

CC No.	Utility	UDC No (where given)
1	Decoration	59
2	Feed	32 33 34
3	Food	31 4 5
4	Stimulant	37
5	Oil	385
6	Drug	38 388
7	Fabric	35
8	Dye-tan	386 387
91	Adhesive	393
92	Manure	

A similar difference exists between CC and UDC in regard to the schedule of organ isolates also. Here is the table:

CC No.	Organ	UDC No.
1	Sap	395 or 5
2	Bulb	52
3	Root	1
4	Stem	3
5	Leaf	54 55
6	Flower	
7	Fruit	4 56
8	Seed	31 56
97	Whole plant	

On these basis 90 (10X9) utility cum organ isolates are possible. But till now, only 52 of these comprehend agricultural plants. The number of species comprehended by each of the 52 isolates is not the same. It is one in the following nine cases:

CC No.	Name of Utility cum Organ isolate	UDC No.	Approximate number of Agricultural Species
24	Feed stem		1
397	Food, whole plant		1
47	Stimulant, fruit		1
53	Oil, root		1
57	Oil, fruit		1
76	Fibre flower		1
77	Fibre fruit	5528	1
88	Dye-tan seed		1
9197	Adhesive, whole plant		1

On the other hand the number of species is more than 64 in the following cases.

CC No.	Name of Utility cum Organ isolate	UDC No.	Approximate number of Agricultural Species
15	Ornamental leaf		676
16	" flower		2928
197	" whole plant		267
25	Feed leaf	32	82
37	Food, fruit		203
38	Food, seed	31 36	84

221 Group 1

Each of the following 26 utility cum organ isolates comprehends not more than 8 species.

CC No.	Name of Utility cum Organ isolate	UDC No.	Approximate number of Agricultural Species
24	Feed stem		1
31	Food sap		5
32	Food bulb	52	4
36	Food flower	535	3
397	Food whole plant		1
41	Stimulant sap		3
43	" root		2
45	" leaf		6
47	" fruit		1
53	Oil root		1
54	" stem		2
57	" fruit		1
597	" whole plant		2
62	Drug bulb		2
66	" flower		7
73	Fibre root		2
76	" flower		1
77	" fruit	5528	1
797	" whole plant		2
83	Dye-tan root		6
85	" leaf		7
87	" fruit		4
88	" seed		1

222 Group 2

Each of the following 17 utility cum organ isolates comprehends more than 8, but not more than 24, species.

CC No.	Name of Utility cum Organ isolate	UDC No.	Approximate number of Agricultural Species.
33	Food root	51	19
34	" stem	52	10
48	Stimulant seed		12
56	oil flower	3811	20
58	" seed		15
61	Drug sap		9
63	" root	3815	20
64	" stem	3814	19
65	" leaf	3812	10
67	" fruit	83 84	15
68	" seed		13
697	" whole plant		13
71	Fabric sap	391	13
74	" stem	3524 3525 3527	19
75	" leaf	3526	21
78	" seed	351	10
925	Manure leaf		12

223 Group 3

Each of the following 3 utility cum organ isolates comprehends more than 24, but not more than 64, species.

CC No.	Name of Utility cum Organ isolate	UDC No.	Approximate number of Agricultural Species
35	Food leaf	354 355	44
55	Oil leaf		25
84	Dye-Tan stem		40

224 Group 4

Each of the following 2 utility cum organ isolates comprehends more than 64, but not more than 200, species.

CC No.	Name of Utility cum Organ isolate	UDC No.	Approximate number of Agricultural Species
25	Feed leaf	32	82
38	Food seed	31 56	84

225 Group 5

Each of the following two utility cum organ isolates comprehends more than 200 but not more than 512 species.

CC No.	Name of Utility cum Organ isolate	UDC No.	Approximate number of Agricultural Species
197	Ornamental whole plant	5977	267
37	Food fruit	4 56	203

226 Group 6

Each of the following two utility cum organ isolates comprehends more than 512 but less than 4096 species.

CC No.	Name of Utility cum Organ isolate	UDC No.	Approximate number of Agricultural Species
15	Ornamental leaf	5975	676
16	Ornamental flower	5966	2928

3 JUNCTION LINK

In the chain of botanical classification, species forms the sixth link in 1P1. In the chain of agricultural classification; it forms the third link in 1P1 . Thus species forms the 'junction link' of the botanical and agricultural chains. Every botanical species does not form an agricultural plant. In botany it is seldom that need arises for adding a link below species. But in agriculture it is the link below species that is of paramount importance.

4 CULTIVAR

A link in the agricultural chain occuring below species is a 'cultivar' (cultivated variety). The number of cultivars in a species may run to many thousands. According to Chronica botanica, 13, 5, Nikolai Ivanovitch Vavilov (1887-1942)is said to have identified 26, 000 cultivars of wheat during his expeditions of 1923-31. According to Introduction to the botany of Field crops, V 1, Cereals (1936) by J. M. Hector, 3, 500 cultivar name of rice are on record in the Philippines, and more than 8, 000 in India. Many thousands are known in other plants also.

41 Literary Warrant

We shall use the term 'literary warrant' to indicate the quantity of documents produced or likely to be produced on a class. The literary warrant in regard to agriculture can be stated in general terms as follows:

Class	Macro-document	Microdocument of Research Value
Agriculture (General)	Many	Hardly any
Utility class	Many	Very few
Utility cum organ class.	Many on many classes and only a few in some	A few
Species	A few on some classes and hardly any on others.	Many
Cultivar	Hardly any	Many on Many cultivars.

Macro-document nearly disappears, as it were, when we reach the level of species. It totally disappears at the level of cultivar. On the other hand microdocument appears in appreciable number only at the level of species. But most of the microdocuments belong to the level of cultivars. This literary warrant explains the paucity of classification schemes taking the schedule down to the level of cultivars. It also explains the inadequacy and the unsatisfactory state of classification in regard to species also. For, in the past, classification schemes had been conditioned only by macro-document.

42 Need for Intensification

However, the wide-spread use of documentation work and service directs attention to the need for carrying classification schedule exhaustively through the level of species and fully even into the level of cultivars. To attempt intensive documentation without taking this forward step in classification is to court inefficiency and wastage. No doubt, the structure of UDC does not provide a probe with which depth-ideas can be sounded, isolated, and thrown into helpful sequence. But the analytico-synthetic approach of CC based on the concept of train of characteristics, makes intensification of schedule possible. We shall take up this problem for from section 6 onwards.

5 VERBAL PLANE

51 General

In scientific usage, the name of a plant consists of one or more words. The number of words depends on the number of links in taxonomic chain expressed by the name.

52 Descriptive Table

The following table illustrates the components of a plant name and how to recognise them.

Serial no.	Taxonomic division.	Illustrative name.	Description
1	Genus	1. Oryza 2. Solanum 3. Zea	Latin. Italics
2	Species	1. Oryza sativa 2. Solanum tuberosum 3. Zea Mays	Second word. Latin Italics
3	Cultivar	1. Oryza sativa 'Sirumanian' 2. Solanum tuberosum 'Field Marshall' 3. Zea Mays 'Min. 502'.	Third Word. Roman Within inverted commas.

53 General Observations

Generally speaking, every cultivar is bound to have a vernacular name or a code name. Otherwise communication among people in regard to its would be difficult. Many agricultural species too have vernacular names. But some which are not widely cultivated do not have have such names. e. g.

Potato = Solanum tuberosum (species)
Field Marshall Potato = Solanum tuberosum 'Field Marshall' (cultivar)
Brinjal = Solanum melongena (species)
Snake Brinjal = Solanum melongena 'Sepentinum' (cultivar)
Some genera too have vernacular names.e.g.
Sun flower = Helianthus (genus)
Maiden Pink = Dianthus (genus)
Some families too have vernacular names.e.g.
Deadly nightshade = Solanaceae (family)
Papaw = Caricaceae (family)

Whenever a genus or a species has a vernacular name, the vernacular name of any of its cultivar is multiworded. It consists of the vernacular name of the species or genus followed by that of the cultivar or a code term e. g.
Lilac 'Mont Blanc'

6 NOTATIONAL PLANE

The crux of the problem in the notational plane at the species level is the choice between all through octave notation at the one extreme, and a notation with two or more significant digits on the other. The last, octave got by alphabetical device, cannot be brought into use. The reason for this will be seen in section 8. In optional facets (11) (Annals fact of Abgila, 1951-52, 2, 246-254) Ranganathan has proved that all through octave notation is economical only for 24 isolates or less. A notation with two significant digits is advantageous for more than

24 but not more than 64 isolates. Ranganathan has also shown in an unpublished paper that a base of two significant digits combined with octave notation is an advantage for more than 64 and not more than 200 isolates. Further a notation with three significant digits has been prescribed for a universe with more than 200 but not more than 512 isolates. So also a notation with four significant digits will serve the purpose of a universe with more than 512 but not more than 4096 isolates.

61 Group 1

The universe of each of the 26 utility cum organ isolates of group 1, enumerated in section 221 gives no difficulty. For each universe comprehends only less than 8 species. A species in any of them is represented by a single digit. The total number of digits in the personality number for such a plant will thus be only 3. If the number of species in any of these universes ever exceeds 8 the excess over 8 may be accommodated in the second octave.

62 Group 2

The universe of each of the 17 utility cum organ isolates of group 2 enumerated in section 222 call for an all-through octave notation. For each universe comprehends only 24 species or less. The species in any one of them will be represented by 1, 2 or 3 digits. Of these only one will be significant. Any other will be only the octavising digit "9". Law of Parsimony would require that the allotment of the three octaves to the various species should be based on 'literary warrant'. If the number of species in any of these universes ever exceeds 24, the excess over 24 may be accommodated in the fourth octave. The probability for this is greatest in the universe "75 fibre-leaf"; for, 21 agricultural species are already known in it. The probability for invoking the fourth octave is slightly less in the Universe "33 food-root"; "64 oil-stem"; and "74 fibre-stem"; for 19 agricultural species are already known in each of these. In the remaining 13 universes of group 2, there is not much probability for the use of the Fourth octave.

63 Group 3

The universe of each of the 3 utility cum organ isolates of group 3 ennumerated in section 223, calls for a notation of two digits only. There will be no need for octave notation to represent a species. For each universe comprehends more than 24 but not more than 64 species. The total number of digits in the personality number of such a plant will be 4. A two-digited notation can accommodate 64 species. But none of the three universes in this group comprehends more than 44 known species. Therefore there is hardly any probability for the capacity of a two-digited base being exceeded.

64 Group 4

The universe of each of the 2 utility cum organ isolates of group 4 ennumerated in section 224 calls for notation of 2 or 3 digits. Of these only one or two will be significant. The universes in this group are "25 feed-leaf" and "38 food-seed". These comprehend respectively 82 and 84 species.

641 Allotment of Octaves

There are 25 octaves available. The species may be formed into as many as 25 convenient sets, each with a sought name. 'Literary warrant' should decide whether a set should be given a two digited octave or a three digited ones. This is illustrated in the next section.

642 Food-seed

In the following schedule, a few isolates of each of the octaves occupied are given by way of illustration.

CC. No.	Name	UDC.No.
381	Rice. Oryza.	318
3811	sativa.	
3812	glabberima	
xxx	x x x	
382	Wheat. Triticum.	
3821	vulgare	
3822	durum	
xx	x x	
38291	turgidum	
38292	compactum	
xxx	x x x	
383	Oat. Auena.	
3831	sativa	
3832	byzantina	
xx	x x	
38391	strigosa	

CC No.	Name	UDC No.
38392	brevis	
xxx	x x x	
384	Rye. Secale	
3841	cereale	
3842	montanum	
xxx	x x x	
385	Indian corn. Zea.	
3851	Mays.	
xxx	x x x	
386	Barley. Hordeum	
3861	vulgare	
3862	intermedium	
3863	distichum	
xxx	x x x	
387	Millet	
3871	Grain sorghum. Sorghum vulgare	
3872	Pearl millet. Pennisetum typhoides	
3878	Buckwheat. Fagopyrum esculentum	
38791	Adlay. Coix lachryma-jobi	
xxx	x x x	
388	Pulses	
3881	chick pea. Cicer arietinum	
3882	Pigeon pea. Cajanus Cajan	
3883	Phaseolus	
38831	Green gram. aureus	
xx	x x	
38838	helvolus	
xxx	x x x	
388391	lynatus	
xx	x x	
38839	ricciardianus	
xxx	x x x	
3884	Lablab. Dolichos	
38841	lablab.	
38842	biflorus.	
3885	Pea. Pisum sativum	
3886	Vetch. Vicia faba	
xx	x x	
3888	Cowpea. Vigna catiang	
xxx	x x x	
389	Nut	
3891	Juglans	
38911	Walnut. regia.	
38912	Butternut. cineria.	
xx	x x	
3898	Caryocar	
38981	Swarinut. tomentosum	
xxx	x x x	
38991	java almond. Canarium commune.	
xx	x x	
38997	Edible acorns. Quercus sp.	

65 Group 5

The universe of each of the 2 utility cum organ isolates of group 5 ennumerated in section 225 calls for a notation of three or four digits of which only one, two or three will be significant digits.

66 Group 6

Group 6 mentions two universes, "ornamental leaf" and "ornamental flower". The number of species in them will go beyond 676 and 3000 respectively. The number of digits representing a species within will therefore reach up to 5.

7 CULTIVAR

The number of cultivars of any species is very large. Section 4 has indicated that the number may run to several thousands. New cultivars will frequently come into existance. Old cultivars may go out of use. Thus the Cannon of Permanance cannot be easily satisfied. Further no one particular sequence of the cultivars in a species is more helpful than any other. In the circumstances, alphabetical device is indicated for representing cultivars. The cultivars do have a name of their own in the vernacular. Some cultivars are named by a code number. But such a code number also begins with alphabetical digits. Thus it is convenient to represent all cultivars by the alphabetic al device.

71 Multiplicity of Vernacular Names

A cultivar common in two or more linguistic areas may have two or more vernacular names. If so, the alphabetical device will scatter the literature on them. However, the probability for this is not much. This is due to two reasons. In the first place, a cultivar prevalent in one linguistic area and with a vernacular name appropriate to it usually carries this name when it is introduced into an adjacent area. In the second place a cultivar tends to be essentially local. The identical cultivar is not likely to be cultivated in widely separated areas with different vernaculars.

72 Grouping by Economic Characters

Another problem arises in regard to cultivars. The breeding of specialised cultivars is usually done to meet economic needs. It may be to make the plant adapt to different ecological and ontogenetic factors or inherit utility factors such as cooking quality, high yield and long lint. It is for consideration whether the first order array after the species number may not be given to these factors and the actual cultivar number be accommodated in the succeeding array. The isolate numbers of this new array, to be so interpolated should each be a single capital letter. If this can be done, this isolate number can also be attached immediately after utility number or species number.

8 CONVENTION

The above discussion indicates the following convention:

1 Utility cum organ number will always be in arabic numerals;
2 Species number will always be in arabic numerals; and
3 Cultivar number will always begin with Roman Capital digit.

This convention satisfies the cannon of distinctiveness and that of expressiveness to a convenient extent.

81 Abandonment

In the arrays for species, the fourth zone is abandoned altogether. Similarly in the cultivar array, the third zone is abandoned altogether. This may look like running available digits to waste. But this loss is compensated by the advantage to the Cannons of Distinctiveness and Expressiveness. Moreover, difficulty would be caused by the use of alphabetical device both for species and cultivar, because the number of digits representing an isolate is indefinite in alphabetical device. Therefore it would be impossible to know where species number ends and cultivar number begins.

82 Past and Future

In UDC the grouping of agricultural plants is somewhat arbitrary. In CC it is more in conformity with economic use. However, in the current edition - edition 4, 1952 - provision has been made only for certain well-known agricultural plants. This has no doubt proved sufficient for the classification of macro-document. However there may be a micro-document on any single species or cultivar. To group them and to individualise them in a helpful way, the analysis made in this paper has become necessary. Future documentation work will need the pursuit of the subject along these lines. Work is now in progress in expanding the crop schedule - 1P1 - in CC. The present analysis has however, left undisturbed many of the already ennumerated plant numbers that are rich in literature. This is a comfort.

DOCUMENTATION IN MANY LANDS

1. TERMINOLOGY AND FUNCTION

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The advantage of a carefully determined terminology in the discipline of cataloguing is assumed. A consistently worked out terminology is given. It falls into the 8 groups work, document, author, type of document, documentation list, species of documentation list based on content and structure, documentation personnel, and service and organisation. Incidentally it defines the distinctive functions of documentation lists of the international, national and local levels. The subtle difference between documentation on the one side and bibliography and reference service on the other is brought out. An economical set up for translation service within a country, reproduction service and documentation outposts is also indicated.

20356

There is still much confusion in the minds of people about documentation problems. Unhelpful and unrealistic weightage is given to the different processes and problems involved in documentation. Time has come to define the terms involved, as closely as possible. For documentation has been practised in several countries, by now, for nearly a decade. There are two ways of arriving at some standard regarding the problems involved in documentation. One way is theoretical. Another is descriptive.In the form former way, we should start with a proper terminology. This will incidentally isolate the problems of documentation. Then we can examine the why of documentation. Perhaps, we may also get a clearer picture of its how. In the latter way, we may describe the practices in vogue in several lands. A comparative study of these may indicate the world-trend. It is proposed to pursue the subject in this series of articles, along both of these lines. We shall begin with the first line. Afterwards, we may endeavour to devote one article to each country.

1 WORK

11 Knowledge - unit. - An assumed term.
12 Thought - Knowledge unit.
13 Expressed thought - Thought expressed in language or symbols or in any other mode, and thereby made communicable
14 Work - Expressed thought.
15 Title - Name of work.

2 DOCUMENT

21 Embodied thought - Record of work on paper or other material, fit for physical handling, transport across space and preservation through time.
211 Recording may be done by hand or printing process, or by near-printing process, or by type-writing, or by any kindred process, or by sound-recording machinery, or by any other means.
212 Record also denotes a record reproduced, by photographic or other processes, from a record already made.
213 The material on which record is made may be paper or any substitute for it, or any other material suitable for the recording process used.
22 Document - Embodied thought.
23 Thought-content of a document - the expressed thought embodied in the document.
24 Volume - Several leaves of paper or several units of other material, used for recording a work, forming the whole or a part of a document, fastened together, so as to be opened at any particular place.
25 Contribution - A part of a document, embodying a distinctly recognisable work by itself.

3 AUTHOR

31 Person - An assumed term.
32 Corporate body - A number of persons taken collectively - usually as united, or coming together informally, in a common cause or for a common action such as government, business, deliberation, research, collective expression of opinion or collective statement.
321 A corporate body may be a government, a local body, an institution, a conference, or an organ of any of the above.
33 Author of a work - Either 1 person creating a work, or 2 corporate body owning responsibility for the thought and expression constituting the work.

Cutter's Rules for a dictionary catalogue defines 'author' as follows:- "Author, in the narrower sense, is the person who writes the book; in a wider sense, it may be applied to him who is the cause of the book's existence by putting together the writings of several authors (usually called the editor, more properly to be called the collector". The term "writes" is too loose. It may even include amenuensis.The 'wider sense' also makes the term too loose.

Prussian instructions does not define the term "Author". It takes it to be an assumed term.

ALA rules for author and title entries defines author as "writer of a work, as distinguished from the translator, editor etc. By extension an artist, composer, photographer, cartographer etc .... In a broader sense, the maker of a work, or the person or the body immediately responsible for its existence". This is too loose. The term "maker of a book" may even be misconstrued to include the "printer". The definition adds "a corporate body may be considered the author of publications issued in its name or by its authority". This is too loose. The term "by its authority" may open the flood gates.

Vatican code defines "author" as "the one responsible for a book; this may be one or mor individuals or a corporate body". The term "responsible for a book" is too loose. It may also include publisher or sponsor.

Ranganathan's classified catalogue code gives a definition more or less equivalent to the ones given in this paper.

34 Contributor - Author of a contribution forming a part of a work.

35 Joint author - One sharing responsibility with other(s) for the thought and expression contained in a work, the portion for which each is responsible not being specified or seperable.

4 TYPE OF DOCUMENT

41 Periodical publication - Document with the following attributes:-

1 A volume or a small group of volumes of it is intended to be published or com completed normally once in a year or at other regular intervals, though irregularity in interval is not ruled out;

2 Each successive volume or periodical group of volumes is usually distinguished by the year of publication comletion, and or by a number belonging to a system of simple or complex ordinal numbers; such a number is called Volume Number;

3 The intention had been to continue the publication of the volumes for ever, though not actually carried out;

4 The intention had been to continue the same title in all the volumes, though not actually carried out; and

5 Either 51 Each volume is made up of distinct and independent contributions not forming a continuous exposition, normally by different contributors and normally the specific subjects and the authors of the contributions in successive volumes being in general different, but all the specific subjects falling within one and the same region of knowledge;

Or 52 Each volume or each periodical group of volumes embodies more or less similar information mainly relating to its year or other period of coverage.

411 The term 'periodical publication' is also used to denote any volume of a 'periodical publication' as defined in 41.

42 Periodical - Periodical publication with the attribute 51 mentioned in 41

421 The term 'periodical' is also used to denote any volume or any fascicule of a 'periodical' as defined in 42.

43 Serial - Periodical publication with the attribute 52 mentioned in 41.

431 The term 'serial' is also used to denote any volume or any fascicule of a 'serial' as defined in 43.

44 Book - Document other than a periodical publication. That is, it is completed or is intended to be completed in one volume or in a finite number of volumes.

45 Composite book - Book with two or more contributions, each with its own title, distinct and independent, all the contributions not together forming a continuous exposition, and often, though though not necessarily by different authors.

451 Ordinary composite book - Composite book provided with a single, generic title to denote all the contributions collectively.

452 Artificial composite book - Composite book which is not ordinary, that is, without a generic title to denote all the contributions collectively.

46 Simple book - Book which is not composite, that is, which embodies continuous exposition by a single author or by two or more joint authors.

47 Multi-volumed book - Book in two or more volumes, giving a continuous exposition of a subject, and for this or for any other reason in the distribution of thought among the volumes, compelling all the volumes to be treated as an inseparable set, that is, as if they take the place of a single volume.

5 DOCUMENTATION LIST

51 Catalogue - List of the documents in a library or a collection forming a portion of it.

52 Macro thought - Thought of some extension, arbitrarioy defined as forming the thought content of a book of not less than 50 pages.

521 Micro thought - thought of small extension but of great intension, arbitrarily defined as one forming the thought-content of a book of less than 50 pages, or of an article in a periodical, or of a small part of a book.

53 Macro document - Document embodying macro thought.

531 Micro document - Document embodying micro thought.

54 Bibliography - List of documents listed together for some purpose. In the restricted use of the term, the purpose is to bring to the attention of reader(s) an exhaustive or a selective list of documents relevant to his pursuit of study or enquiry. Originally, it included only macro documents.

55 Documentation list - New name for bibliography with emphasis on the inclusion of micro documents and on the reader served being a specialist engaged in research, business, deliberation or administration.

6 SPECIES BASED ON CONTENT AND STRUCTURE

61 Bare documentation list - A documentation list mentioning the author, the title and either (1) collation and imprint in the case of a macro document or (2) the name of the host document and the exact place of occurrence within it in the case of a micro document.

62 Annotated documentation list - A documentation list in which the scope, the standard and the authoritative nature of a document is indicated in brief terms in all cases found necessary.

63 Documentation list with abstracts - A documentation list in which a brief statement of the essential contribution to knowledge made by the document is given in the form of an "abstract". The abstract may bring out all the foci in the document. Then it is a 'general abstract'. Or, it may have a slant towards a specific interest. Then it is a 'local abstract'. The library of a particular institution will prefer to make a local abstract so as to be helpful to its clientele whose interest it knows.

64 Documentation list of contents - A documentation list giving, in a separate block of its own, the contents of each periodical covered by it.

This is the cheapest form of documentation list. It does not require the continuing help of a classifier or a cataloguer. It is largely a matter of assembling the contents-pages in a prescribed sequence and producing copies.

This is the least helpful form of documentation list. This represents a primitive stage

65 Dictionary documentation list - A documentation list giving in one alphabetical sequence entries of each document both under the name(s) of its author(s) and under its specific subject.

This is more helpful than the "contents" list This represents a more evolved stage.

66 Documentation list on broad subject basis - A documentation list which groups the documents under a few subjects of large extension and arrays the documents in each group alphabetically by authors' names.

This form is more helpful than the dictionery form. Its helpfulness increases with the increase in the number of subject groups used.

67 Classified documentation list - A documentation list in which the documents are arranged systematically by their specific subjects. This arrangement requires the use of class numbers to represent subjects. This is the most helpful form. It represents the latest stage of evolution reached so far. It should be backed by a schedule of class numbers. It will be even more useful if it is backed by an alphabetical index giving in one sequence class index entries and author index entries. The need for this index will increase with the size of the documentation list.

68 Species Based on service aimed

681 International documentation list - A documentation list of more or less exhaustive international coverage of periodical publications and books.

The production of this list is bound to suffer from time-lag.

682 National documentation list - A documentation list suited to the exact requirements of the investigations, the industries and the administrative and scientific work actually in progress within the nation, and confined to the publications produced or received in the country.

This selective list is produced to get over the time-lag of the exhaustive international documentation list. Since the latter involved time-lag in any case, it is found to be an advantage to make it of the abstracting variety. The main objective of the national documentation list being the bridging of the time-lag, it is expedient to make it a bare list. But the time and energy needed to make it of the classified variety should be given to make it of maximum possible help to the users.

The national documentation list, in a classified form, will put the specialists on the alert and make them look up the new documents relevent to the work pursued by them, as soon as they are released or received in the country.

683 Local documentation list - Documentation list prepared in an individual library. It is severely selective. It is turned exactly on the work in progress among its clientele.

It is best confined to the resources available within the library.

684 Continuing documentation list - Documentation list produced periodically at any of the three levels, listing the documents appearing during the period covered, and without being selected to suit the requirements of a particular reader or of a specific topic under investigation.

This is of the nature of a general appetiser. It endeavours to keep the clientele informed promptly of all the nascent thought created in their fields of work and fields related to them.

685 Anticipatory documentation list - Documentation list on a specific topic anticipated to engage the attention of the members of the parent body.

Example:- In a parliamentary library, on any legislative measure in contemplation. In a University library, on any topic forming the subject of discourse of a special course of lectures. In the United Nations Library, on any topic being brought into the agenda, say, of the Security Council.

686 Documentation list on demand - Documentation list prepared on demand by a particular individual.

The two latter species of lists are best done by local service libraries. For, an intimate knowledge of the needs of the clientele is essential for its preparation. It should certainly cover all the relevant material in the collections locally available. It should also add other items. For this purpose, search in other libraries -non-local libraries - may become necessary. This will not however arise very often.

In some cases, it is best done by the local librarian visiting the other libraries, occasionally even libraries outside the locality.

In some cases, it may lead to national economy if the search is made by a national central agency. But the latter can not get that intimate knowledge of the exact requirements of the reader as can be got by the local librarian in direct and frequent touch with him. Therefore, the topics, for which national central agency can prepare documentation list on demand, will be small in number. In most topics, an economical arrangement will be for the local library to send a copy of the documentation list, prepared by itself, to the national central agency and for the latter to supplement it.

7 DOCUMENTATION PERSONNEL

7 Documentation Work - Work of preparing documentation list of any of the species mentioned in 56 and its subdivisions.

71 In the case of a continuing documentation list, documentation work consists of selecting the documents found in the currently received periodicals and books classifying them, cataloguing them, and preparing the script for multiplication of copies.

72 In the case of an anticipatory documentation list, documentation work consists of selecting the relevant documents retrospectively as well as currently and dealing with them as in 71.

Here, the search for the materials of the past is of the very essence. The period up to which the search should be extended will vary with the topic and with the angle from which the topic is pursued.

73 In the case of a documentation list on demand, documentation work can be more exactly directed to determine the relevant materials sought and can be checked up by contact with the reader at every stage. There may not be need to multiply copies of the list.

75 Documentalist - Person preparing a documentation list of any of the three kinds mentioned in 71, 72 and 73. He should have a sound knowledge of library classification and of cataloguing technique. Documentalist for continuing documentation work need not know the readers personally. But a national documentalist of this kind must have information about the regions of knowledge on which investigation is in progress within the nation. He must develop the necessary means of informing himself of

this. He must maintain a card fild of such topics.

76 Documentalist for anticipatory and on-demand documentation work is essentially a reference librarian.

8 SERVICE AND ORGANISATION

81 Documentation service - The act of procuring the document, selected by a reader from out of the documentation list supplied to him. It can be done by a general library assistant. His business will be to pick out the document concerned from the collection within the library and if it is not available there, to locate it in any other library, and get it on inter-library loan if possible. He need not be an adept in the work of classification or cataloguing. It is sufficient if he can understand a class number and use a catalogue. He may be designated Procurement Assistant. In many situations, where the demand can be met from the collection of the local library itself, documentation work and documentation service need not be seperated. They will be done together by the reference librarian.

82 Reproduction service - The act of making a copy of a document needed, either by photo-process or by any other process. Reproduction will be necessary when a reader wants to own a copy of the document needed by him. It will also become necessary, if a document is in some other library which can not lend it out. The reproduction may be of a size admitting of being read directly, or it may be in micro-size needing the use of a 'reader'.

821 The personnel for reproduction service need not have competence in library science. He should be only a technician with competence in the mechanical handling and reproduction of a document.

822 Convenience requires that he should work under the general direction of the head of the library.

83 Translation service - The act of translating a document from one language into another preferred one. It may consist of a full translation or of furnishing a summary or abstract of the document, in the preferred language. A trivial possibility is furnishing a translation of the title of a document.

831 The personnel for translation service need not have competence in library science. He should have competence only in the languages handled by him, with special emphasis on the the technical terminology current in different subject fields.

832 The demand for translation will not be continuous enough to maintain a permanent translation staff for all the languages - perhaps even for any one language. Economy will indicate two types of organisation of translation service:-

1 For each library or each group of libraries to agree upon a panel of translators, who do translation service on contract basis;

2 For a national centre to maintain a small group of translation personnel for editing and co-ordinating the translation work done on contract.

833 Convenience requires that the translation personnel should work under the general directions of the head of the library.

84 National Documentation Centre - Institution in charge of

1 the continuing documentation work of national coverage described in 684;
2 Multiplication of the continuing National documentation lists, and their distribution;
3 Helping of local libraries in the location of documents within the country and promotion of inter-library loan of documents;
4 Location of documents outside the country and the procurement of international library loan of them, or of copies of them for retention in the country;
5 reproduction of a document by photo-methods or other methods for supply to users;
6 Editing of translations made by the translation panel of the nation, whenever warranted,
7 Maintenance of the national pool of translations, documentation lists, and copies of unpublished documents of value, of making them available for users, and thereby effecting national economy in these services.

841 National Documentation Centre may be an omnibus one covering all subject fields; or there may be a separate National Documentation Centre for different broad regions of knowledge. The former will be conducive to efficiency of service, co-ordination of effort, and national economy.

842 The most helpful location for the omnibus National Documentation Centre is the National Documentation Centre is the National Central Library. For this will have an exhaustive collection of the documents produced within the nation. It will have, perhaps, the biggest collection of foreign documents. It will, further, have the National Union Catalogue of all the important foreign books and periodicals available in the different libraries of the country.

843 In a country whose organisations of library service began more than a century ago - that is, before the libraries were charged with documentation service - the national central library has been tending towards the preservation and exhibition of bibliophilic materials and catering to the needs of antiquarian research. The emphasis of its service was along these lines. It did not generally assume responsibility for documentation service. But the needs of industries and research in fundamental sciences were pressing. Therefore, an independent national documentation centre came to be established, in spite of the avoidable wastage due to duplication of materials, personnel and work.

844 But it is blind capitulation to everything foreign, if a newly developing country initiates such a procedure and makes the National Documentation Centre independent of the National Central Library. Efficiency and economy would make the former an integral but functionally differentiated part of the latter.

x 845 The capitulation and the national wastage would be even greater if centripetal forces resulting in different national document centres for different regions of knowledge such as medicine, other sciences, humanities and social sciences.

85 Documentation Outpost - A regional office of the National Documentation Centre,

851 The function of a Documentation Outpost will be:

1 To find the demand for documentation work;
2 To decide the topics to be covered by the national documentation list;
3 To promote the wide-spread and efficient use of the national documentation list;
4 To locate and to procure the documents needed for reproduction;
5 If the quantum of work warrants it, to maintain the plant for Reproduction of documents.
6 To do liason work with the members of the Panel of Translators, living within the area of the outpost; and
7 To procure copies of worthwhile unpublished documents for the national pool at the National Documentation Centre.

852 A Documentation Outpost may have to be established in each of the important library and research centres in the country.

In India, for example, one may have to begin with Bombay, Calcutta and Madras. The need for outposts in other places will grow with the growth of research and industrial activity.

853 The most helpful location for Documentation Outpost will be the State Central Library if the locality is the capital of a constituent state. The advantage of this is the same as the advantage of having the National Documentation Centre at the National Central Library.

86 The National Documentation Centre has an important "Laboratory Function". The technique of Documentation Work is an ever-growing one. The discipline of classification and cataloguing needs continuous sharpening. This sharpening work can be made purposive only if it is geared closely to the task of depth-classification involved in documentation work. The difficulties challenging the documentalist and the solutions improvised by him should not be allowed to dissipate away. They should all be garnered and pursued in the domain of the discipline of classification and cataloguing. If this is not done as a concurrent process, the efficiency of documentation work and service will gradually degenerate. The result will not be seen at the moment. But the cumulative result in course of time will be appalling. The National Documentation Centre should bear in mind the need for concurrent research in classification and cataloguing, in fixing the strength of the cadre of documentalists.

861 A similar problem arises also in relation to reproduction and translation of documents.

862 To keep the research attitude alive, to feed it, and to help the nation to radiate to foreign countries and to get irradiated from outside in all techniques connected with documentation, the National Documentation Centre should maintain a learned organ to form the

medium of expression for all the new thought on technique created by it and all the new devices improvised by it.

87 The National Documentation Centre should also take charge of the production of the International Abstracting Periodical in a few subjects. There should be an international agreement regarding the distribution of the subjects among the different nations in the matter of the production of international abstracting periodicals. Whatever subjects come to the share of a nation, its National Documentation Centre should be charged with all the work connected with it.

STANDARD FOR LAY-OUT OF CATALOGUE CODE

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As a result of renaissance Asian countries are on the eve of framing catalogue codes in different languages. At the international level also thought is being turned on comparative study of catalogue codes and arrival of the greatest common factor. In this context a standard is suggested for the lay out of a Catalogue Code. The distinctive functions of an International Catalogue Code, Linguistic or National Catalogue Code and a local Catalogue Code of a particular library are brought out.

1 PRESENT STATUS

Library Catalogue is an ancient library tool. But library code of a rigorous kind is of recent origin. It first attained some rigour in stray local codes -- i.e. in individual libraries. Now it is attaining rigour in national forms. An international code is yet to be established. Ccc has, however, some features necessary in an international code.

11 Why All This

There is need for the preliminary settling of principles and style. Any document embodying any recorded socialised though produced in any form on earth is needed for consumption in every other spot. Without the aid of catalogue, documents cannot be located. Unlike classification, catalogue cannot use a purely artificial symbolic international language. It has to be expressed in a language. Of natural languages there will always be many. This linguistic hurdle obstructs international exchange of thought. But the language of the headings in catalogue entries can be made to shed most of its hurdles, though the script, the nouns used and just a handful of the auxiliary words needed are preserved in natural language. This is not yet fully realised. At any rate, it has not yet been fully exploited. By agreeing on normative principles and on the ideal to be reached in regard to the drafting of the rule, it can be exploited. The result will lead us nearly to the best help possible in making socialised document circulate effectively among all its possible readers in spite of the basic words in the heading belonging to an alien language. An additional help of great potency will be the classified form of catalogue using a good scheme of classification. Obviously, none of these can overcome the political barrier obstructing the flow of documents qua physical materials. But to the extent to which political curtains allow their free flow, the various national catalogues would admit of easily being pooled and used together. This will give the best help available in circulation. On this assumption let us work out a lay-out for catalogue code as the basis for further discussion.

2 LAY-OUT

Each catalogue code -- whether international, linguistic, national, local, or bibliophilic, -- should have a similar lay-out. This is the next point to be agreed upon at the Round-Table.

21 Terminology

A code should begin with a chapter on terminology. Terminology of a discipline is different from the natural language used as meta-language to build up the technical language. Natural language grows in the lips of the man in the street. In spite of the severest control and taboo, by even the most influential academy with the least possible territory of sway, natural language cannot be tied down without growth. Therefore to frame a code of rules entirely in a natural language is therefore to court trouble sooner or later. But the use of a natural language as a meta-language to establish the terminology of a discipline will lead to much harm. The terminology can grow or change only in the hands of the small specialist hands establishing it. Further, this class is presumed to be trained in scientific method and in terminology. This does not mean that cataloguing terminology can be made eternal. It too must change. But it will be changed with notice, circumspection and conformity to the Canons of Terminology. These canons themselves are the products of severe scientific method.

211 Expectation of Life

Convenience requires a fairly long expectation of life in a catalogue code. Changes in it should be few and far between. In this a catalogue code is comparable to an enacted constitution of a country. The amendments should be even more few even for a long stretch of time. Agreement on normative principles, pure style without roughage words and properly defined exclusive terminology can secure this quality in a catalogue code.

212 Basic Word

The basic words used in the terminology of a catalogue code will have to be naturally different in different natural languages. But the meanings of the corresponding 'terms' in different languages can be and should be made to be strictly alike. The number of technical terms needed in cataloguing terminology are only few. Moreover, cataloguing terms denote comparatively concrete concepts. Therefore, their meanings can be made precisely alike, with the aid of suitable examples.

213 Multi-Lingual Glossary

It should be quite possible to have a multilingual glossary for the few scores of cataloguing terms.

214 Guineapig

The correct procedure should be:-

1 To start with some consistently and organically worked-out terminology in on natural language;
2 To find out equivalent in other natural languages;
3 To examine their shades of difference in their natural language, as shown in illustrations;
4 To see how best terms of precisely the same meaning can got out of them eithe by modification or by official redefinition; and
5 To see the resultant terminology in natural language as an organic whole, internally consistent and freed from flaws o synonym and homonym.

Some languages, such as English, spoken in distant lands, naturally reflect a tendency to autonomy. Here each linguistic group will hav to do some preliminary work to arrive at the agreed common terminology. Each catalogue code should have a chapter on self-consistent and fairly exhaustive terminology.

22 Normative Principles

Then should follow a chapter on normative principles. It will be of use both in making the rules in the code rigorous and in interpreting the rules to meet difficult situations in cataloguing. The essential Principles of Interpretation, likely to be of value in applying the rules of a catalogue code should be added.

23 Main Entry -- Main Heading

Next should come a chapter on Main Entry, even so it should be confined to the choice of its heading.

231 Kinds of Document

This chapter should deal with the choice of heading for main entry of every kind of document -- simple, multi-volumed, ordinary composite, artificial composite, periodical and serial.

232 Kinds of Catalogue

This chapter should also indicate any difference necessary in the practice of Classified cat logue and that of Dictionary Catalogue.

233 To be Avoided

The determination of who the author of a ocument is should not be left to the rules of is chapter. This question should be settled lly in the sections on author and collaborator the chapter on Terminology.

24 Rendering of Heading

The next chapter should be on the rendering f Heading. Its rules will be applicable to all inds of entries. It should settle the question f multi-worded names of different kinds, -- f persons, places, corporate bodies, or their rgans, or titles of documents. These rules ould clearly lay down the rules backed by umerated schedules, wherever necessary, the ethod of spotting out the entry word, entry lement, secondary element, impotent but ir-emovable element, impotent and removable ement, main heading, and successive subhead- gs.

25 Main Entry -- Sections other than Heading

The succeeding chapter should give rules for e choice, rendering and sequence of the sec- ons - other than heading -- that may have to pear in main entry. It should have special ections of rules on the different kinds of docu- ents mentioned in section 24. The number d the nature of these sections will vary with e nature of the catalogue, the material, and e library.

26 Non-Subject Book Index Entry

The next chapter should be on the choice and ndering of book index entries other than sub- ct entries of Dictionary Catalogue and cross ference entries of Classified Catalogue. Its les should mention the descriptive words to added to the heading. If unit card system is t followed, it should also give rules on other ctions. The number and kinds of added entries be given will depend on the nature of the li- ary and the available national and international bliographies listing micro-thought.

27 Subject Entry

There should be a chapter on subject entry. Classified Catalogue this would mean Cross eference Entry -- i. e. subject analytical -- and Class Index Entry. In Dictionary Catalogue it would mean Specific Subject Entry -- or Subject analytical -- and See also Subject Entry. This is the most imprecise, inconsistent, and unsatisfactory chapter in the codes giving them. The Ccc and its twin Dictionary Catalogue Code have tried to bring in some consistency, precision, and mechanisation in this matter, by chain procedure. How far this can be adapted to documentation work on micro-though is yet to be seen.

28 Cross Reference Index Entry

There should be a chapter on Cross Reference Index Entry. It should collect together all the rules on this class of entries. They should not be scattered in the chapters on heading or rendering of names. This spoils the unity in rules and also irritates or produces a cloudy sense. Every code will gain in value by following it with equal strictness.

291 Periodical Publication

Periodical publication should have an extra chapter. This chapter should deal with the way of handing all the 18 idiosyncracies to which it is prone.

292 Style of Writing

There should be also a chapter on the style of writing, or typing or printing entries. No doubt, this will depend on the favoured script of the library.

293 Odds and Ends

There should also be chapters on other odds and ends, such as contraction, punctuation mark, capitalisation, arrangement of entries etc. These chapters will also depend on the nature of the catalogue, and the favoured language of the library.

3 INTERNATIONAL CATALOGUE CODES

An international catalogue code cannot give definitive rules in some of its chapters. It may have to give only a blue-print as it were. Perhaps, it may give some directives in a few cases. It may even give samples. There are, however, some chapters where it can be complete. Such chapters can be incorporated in other kinds of code in its favoured language. Others can only be adapted in them.

31 Bodily Adoption

The chapters on normative principles, choice of heading for main entry, book index entry, cross reference index entry and periodical publication can be bodily adopted by other codes from the international code, with perhaps omission of a few rules.

32 Directive

The chapters on rendering of names and style of writing of an international code can only be taken as directives by any other code.

33 Adaptation

The chapters on terminology, and odds and ends should be suitably adapted by the other kinds of codes.

4 NATIONAL CATALOGUE CODE

Language is the very essence of communication. Catalogue is a means of communication. It should therefore be in the language of the nation if it is monolingual. The distinctive function of a national catalogue code will therefore be to give precise rules on the style of writing. Again, the structure and the sequence of words in names will be generally a distinguishing feature of a nation with a strictly homogeneous cultural group. Therefore, another distinctive function of a national catalogue code will be to give precise rules on the rendering of name. These rules will have to be backed by the necessary number of schedules of removable impotent elements, irremovable impotent elements, and multi-worded entry names. It should also give some fool-proof device for the entry element and secondary element being distinguished from each other by a foreign cataloguer. The chapters on terminology and odds and ends may have to be adapted by it from those in the international catalogue code. But it will adopt bodily all the other chapters, including the one on sections of main entry other than heading. It is by the effective carrying out of the directives of the international code that a national catalogue code can make itself as useful to its outsiders as to its own people. Further, the adaptation of the terminology in full conformity to the explanations and the examples of the international code will help the building up of multi-lingual glossaries of cataloguing terms.

5 REGIONAL CATALOGUE CODE

Some countries consist of cultural sub-grou and are linguistic sub-groups. In their case, a national catalogue code cannot go far beyond an international catalogue code. Therefore, all th remarks of section 4 will be applicable to them. India, Russia and Switzerland, Yugoslovia and Czechslovakia are examples of such countries. Reciprocally it will be a help if two or more countries more or less the same culture and language agree to have a common regional catalogue code. Great Britain, Australia and Unite States can have a single regional catalogue code

6 LOCAL CATALOGUE CODE

The main function of a local catalogue code - say, the catalogue code of a particular library - will be to adapt the rules of the national or the regional catalogue code so as to suit the local variation. There may not therefore be a need to have a full-fledged local catalogue code. A supplement to the national or regional catalogue code showing the policy of economy adopted by the library will be sufficient. But it is necessary, for cataloguers may come and cataloguer guers may go but the catalogue will go on for ever. Even in the life time of the same cataloguer it is difficult for him to be consistent without the aid of a recorded supplement. Otherwise, the library catalogue will soon become a hotch potch. Moreover, the Canon of Currency and the Fifth Law of Library Science are not unmindful of the library catalogue. Even before the published national or regional catalogue code comes out in a new edition, incorporating the latest alteration, the supplement of a local library catalogue should make all such alterations in its supplement, as and when they become necessary. A periodical revision of the catalogue code, at the national, regional and/or international levels will have to be fed realistically by such alterations introduced in the local catalogue codes, along with the documents necessitating them.

7 BIBLIOPHILIC CATALOGUE CODE

In the case of a bibliographical descriptive catalogue, whether of incunabula or even later documents, a special bibliophilic catalogue code will be necessary. It will have to add many more rules to those of an international code. There are already many such codes in different countries. They are promoted by bibliographical societies.

8 WITH STANDARDIZED TITLE PAGE

The rules on rendering of names and cross reference index entries will be sir plified beyond measure, after the adoptio of an international standard for author st ment on the title page and the supplemen author statement on the back of the title page.

CALCUTTA ...RSITY
CENTRAL LIBRARY

DEPTH CLASSIFICATION *

10. ZONES IN ARRAYS

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Examines the way in which the four zones in arrays of different kinds are utilized. Suggests for the first time a method for utilizing the Second Zone of the first order array of the universe of knowledge. Shows the impossibility of using it in the normal way. Points out the easing of the Third Zone as a result and the provision of an extensive base for receiving the Prel Main Classes emerging so rapidly in modern times. Points out the illusion in the first order array of single digited Basic Classes. Summarizes the results obtained so far about the utilization of arrays of different orders in diverse facets.

1 INTRODUCTION

In Section 32 of "Depth classification 8" (An lib sc, 2, .6), the concept of "Zones of an Array" was touched upon for the first time. It is worthwhile to examine each kind and order of array from the angle of this concept. Such an examination will be like "prospecting" in geology. It may disclose unexploited regions in the notational system of a scheme of classification. It may also indicate wasteful use of some of the notational devices of the scheme. As usual, any such disclosure or indication may bring to notice problems in the idea plane, being overlooked or neglected all along because of handicaps felt in the notational plane.

2 ARRAY OF MAIN CLASSES

The first order array arising out of the first division of the universe of knowledge consists of the main classes of the scheme of classification. The term "Main Class" is reserved for this use. It is not used here in the sense of an "enumerated class" as is the case in UDC. The main classes are not derived on the basis of any characteristic. They are only canonical.

21 Idea Plane

Obviously, all the four zones cannot take shape in the array of main classes. Neither the artificial characteristics of the alphabetical make-up of the name of a main class nor the year of its origin can be used — need be used — to form the main classes in the idea plane. Use of "Subject Device" can have no meaning before the enumeration of main classes is completed. Thus, the idea plane cannot utilise the second or the fourth zone. It can utilise the first and the third zones. But at the time of the earlier editions of CC, this mode of analysis of the idea plane had not been established. Therefore, work in the notational plane was done haphazardly without any direction from the idea plane.

22 Notational Plane

Viewed from the angle of the notational plane, in the first three editions, CC occupied only the third and the fourth zones.

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* Continued from *An lib sc* 2, 1955, 21.

23 Fourth Zone

In the Fourth Zone, the last octave alone was occupied. Each capital letter was used, in general, to represent a long-established main class. Some letters were used to represent partial comprehensions of such main classes. Thus, the last octave of the first order array made it a "telescoped array". The fourth edition added a few more partially comprehensive classes and two regular main classes. This is explained in detail in Section 31 of "Depth classification 8" (An lib sc, 2, 5). The penultimate octave has not yet been utilised. We have yet to find use for it.

24 First Zone

The First Zone — the zone of approach materials covering many main classes — was left, by the first three editions of CC to run to waste. But the fourth edition has brought it to use. Rule 9z4 really amounts to a "trick" designed to bring the first zone into use. z is set apart to represent "Generalia". Then rule 9z4 prescribes: "Whenever the bare digit z (i. e. not amplified by the alphabetical device or by geographical device) calls for anteriorising common sub-division, the digit z may be omitted and it is sufficient if the class number begins with the anteriorising common sub-division digit. Thus a, m, p etc represent respectively, generalia bibliography, generalia periodical, generalia conference etc.

25 Second Zone

The Second Zone has not yet been used. The existence of this zone was sensed in the idea plane only in 1954. The first account of it appeared only in Section 36 of "Depth classification 8" (An lib sc, 1, 7). In the notational plane, the use of packeted notation — packeted between curved brackets — was devised. It is too early to find use for it in the first order array of the universe of knowledge itself. However, a possible use of it is indicated in Section 27

26 Third Zone

The Third Zone has undergone the greate number of changes. Under the pressure of t tradition of DC, editions 1 to 3 of CC utilised this zone in a hotch-potch manner. "2 Libra Science" was a true main class. "9 General Essays" was a partially comprehensive main class. The other isolate numbers were used represent generalia approach materials. T transfer of these to the first zone released many of the digits of the third zone. One wa of utilising them to accommodate the ever-sprouting "prels" was indicated in paper "1. Prels" in "Depth classification etc" (1953) e by S R Ranganathan. These had already been incorporated in edition 4 of CC. These will found in its chapter 9 of part 2. But the present analysis shows that the isolates listed i CC do not form a helpfully homogeneous grou Moreover, the capacity of the third zone is small. It may soon be exhausted. Some of t isolates will find a more helpful place in the Second Zone. Moreover this zone is quite extensive. Its capacity is much greater than th of the third zone.

27 Utilisation of Second Zone

The packeted notation and subject device w carry out this idea. Here is an illustrative schedule got in this way:-

Main Class (Prel)	Old CC No	Proposed CC No.	UDC N
Bibliographiology	6	(a)	0
Festschriftology		(f)	
Encyclopediology	5	(k)	03.0
Periodicalism	42	(m)	0
Serialism	41	(n)	
Conference technique		(p)	
Report-writing	96	(r)	
Commission technique		(t)	
Planning technique		(t5)	
Biographology	7	(w)	92.0
Autobiographology		(w, 1)	

271 Genesis of Prels

An examination of the above table throws some light on the genesis of Prels. These are not concerned with disciplines comparable with any of the traditional main classes represented by capital letters in CC. These are concerned with new main classes slowly stemming in our own days from common isolates of the anteriorising kind. By analogy we should expect other Prels to stem from common isolates of the posteriorising kinds. In CC the substantive digits of posteriorising common isolates are also lower case letters, as in the case of the anteriorising kind. Moreover, there are separate schedules for posteriorising common isolates belonging to each of the fundamental categories: Energy, Matter, and Personality.

272 How to distinguish

It will not be helpful to indicate all such Prels uniformly by packeting the concerned lower case letter. In the first place, many homonyms will thereby get created in the classificatory language. Secondly, the sequence of the Prels may not be helpful. We should therefore find some device for distinguishing the Prels stemming from the isolates of the different kinds. Some conjectures are given in the succeeding sections. These conjectures take into account not only the fundamental categories to which they are related in their genesis, but also the alternative schedules for the posteriorising common isolates belonging to one and the same fundamental categories. The need for having three schedules for posteriorising common energy isolates has been shown in "Depth classifications (5)" (An lib sc, 1, 130). These have been taken to be common isolates representing:-

1 Intellectual activities;
2 Industrial activities; and
3 Institutional activities.

273 Intellectual Activity

Here is an illustrative schedule of Prels likely to stem from common energy isolates of intellectual activity. Some of these are represented in UDC with the help of the colon device.

Main Class (Prel)	Proposed CC Number	UDC Number
Art of making hypotheses	(z1a)	167.5
Art of framing normative principle	(z1b)	17.023.2
Art of deriving law	(z1c)	167.7
Art of criticism	(z1g)	165.65
Art of definition	(z1k)	168.4
Art of observation	(z1m)	165.321
Art of experimentation	(z1p)	167.231
Scientific method	(z1y)	---

The above schedule should be experimented upon, and modified and augmented in the light of the experience gained.

274 Industrial Activity

Here is an illustrative schedule of Prels likely to stem from common energy isolates of industrial activity.

Main Class (Prel)	Proposed CC Number	UDC Number
Planning	(z2a)	.001.14
Model making	(z2d)	.001.72
Job Analysis	(z2e)	.004.13
Workshop Design	(z2f)	.004.24
Finishing	(z2m)	.002.29
Testing	(z2n)	.001.4
Packing	(z2p)	.004.3
Waste Utilisation	(z2w)	.004.8

It must be clearly remembered that these isolates are merely the general theory of the various industrial activities, developed in general terms without reference to any particular host subject. There was little literature on such general theory in the last century. But, in our days, the experiences in the different industrial and governmental activities are being distilled, as it were. The distillate is coming out as the theory of the processes. Planning, Job Analysis, Workshop Design and Waste Utilisation occur in several subjects. In fact, any human activity pursued along rational lines has to pay regard to these ideas. Surely, a general theory of these ideas without reference to any particular activity should be possible. Indeed, specialists are now coming forward in abstract fields of this kind. Till now, we had no means of giving a proper place for such a general and theoretical statement. We were forcing them into industrial economics or engineering or administration or library science and so on. By their very nature, these materials have a touch of the quality of approach materials. And yet, they are not strictly approach materials. Viewed in the idea plane, their place, is after the approach materials but before the traditional main classes. In other words, the second zone, made of packeted numbers, in the first order array of the Universe of Knowledge appears to be just the right place for them. They are all main classes of the species "Prels".

275 Institutional Activity

Here is an illustrative schedule of Prels likely to stem from common energy isolates of institutional activity.

Main Class (Prel)	Proposed CC Number	UDC Number
Secretariate work	(z3g)	
Organisation	(z3h)	06.012
Agenda Work	(z3j)	06.053.3
Conduct of Meeting	(z3k)	06.053.5
Minutes Work	(z3m)	06.053.7
Public Relation	(z3p)	06.07
Management	(z3q)	06.04
Exploration Technique	(z3r)	---
Administration	(z3w)	06.044
Review Technique	(z3y)	---

It should be remembered that these isolates constitute the pure theory of the various institutional activities enumerated. In recent years, general theoretical courses are now offered in these subjects even at the university level. They have just gained the status of Prel Main Classes. It is a great comfort to find a place for them in the first order array. This provisional schedule should be experimented upon, and modified and augmented before it can be finalised.

276 Matter Prel

In Section 6 and its subdivisions of "Depth Classification (5)" (An lib sc, 1, 133-136), a possible use for the first zone of the first order array of matter facet was conjectured. In Section 63, the appropriateness of regarding literature on physical, chemical and vital attributes as approach materials has been examined. But, these common matter isolates have been derived from the traditional main classes themselves. For example, C represents main class "physics"; and c represents the approach isolate "physical constants". Thus, it is impossible for any new main class to stem as a Prel from common matter isolates. Thus, the fundamental category matter does not contribute Prel to the second zone of the first order array of the Universe of Knowledge.

277 Personality Prel

Edition 4 of CC gives, in Section 24 of its Part 2, a schedule of "posteriorising common personality isolates". It is possible for Prels to stem from some of these isolates. The present discovery of the second zone of the first order array had not been made in 1952. Therefore, these Prels were accommodated in the third zone as "8 Institutionology". But, the Prel stemming from the isolate "Profession" could not be accommodated. It is now conjectured that they can be accommodated in the second zone as follows:-

Main Class (Prel)	Proposed CC Number	UDC Number
Theory and art of		
Profession	(z7b)	
Institution	(z7d)	
Museology	(z7e)	
Learned Society	(z7f)	
Observational institution	(z7g2)	
Laboratory	(z7g3)	
Forum	(z7g4)	
Asrama	(z7g7)	

278 Space and Time Prel

Emergence of any Prel Main Class from the common isolates of space and time is not likely.

28 Rebuilding of Third Zone

The preceding sections have suggested the transfer of several of the isolates from the Third Zone to the Second. The surviving Prel Main Classes of the Third Zone may perhaps be rearranged as follows:-

Main Class (Prel)	Proposed CC Number	UDC Number
Universe of knowledge	1	001
Library Science	2	02
Book Science	3	
Standardization	4	
Communicationism	5	

"Book Science" should be distinguished from "Book Production". The latter is concerned with the physical production. Its place is in useful arts. The former is concerned with the intellectual work involved in creating a book. It may include matters that are commonly included in "Guidance to Authors". The digit 4 for "standardization" is suggested by the Canon of Seminal Mnemonics. The main advantage of standardization is eliminating waste. The use of digit 5 to represent "communicationism" is also the result of the Canon of Seminal Mnemonics.

281 Vacant Numbers

The numbers released in the Third Zone in the First Order array are available to be used for representing Main Class Prels likely to emerge in future, but without stemming from any of the anteriorizing or posteriorizing common isolates. This notational technique has increased the extent of the base of Main Classes quite considerably. This is a welcome result. For, there is a tendency at present to develop many abstract subjects, similar to those contained in the various schedules given above.

3 FACET FORMULA

The building of facet formula for each of the many Prels has next to be taken on hand. Of course, each facet will have a First Order array. Corresponding schedules of isolates will have to be constructed. As shown in section 4 and its sub-divisions, the filling up of the schedule for the First, Second, and Fourth Zones will present no difficulty. But the filling up of the Third Zone will require sufficient experience. For the selection of First Characteristics to be used and the Characteristics which fall in the train of each First Characteristic can be determined only in the light of the development and the trend of the literature on the Prel concerned. It is now too early to get any reliable picture of it. Perhaps this work may not become necessary at the level of book or macro thought, for quite a long time. But, documentation work will soon need. For, its efficiency depends on the Depth Classification of micro thought embodied in articles. Even of articles, perhaps we do not have a sufficient number to build up the schedules for the Third Zones. This is a matter in which the profession should itself be vigilant.

4 ARRAY OF CANONICAL CLASSES

Some of the main classes - viz with mathematics, physics, geology, useful arts, fine arts and philosophy do not admit of division on the basis of characteristics belonging to fundamental categories, even at the first stage of their division. On the other hand, they have to be divided into Canonical Classes. The Canonical Classes of a Main Class form an array of the second order. In such an array only three Zones are available. For, the First Zone is occupied by anteriorizing common isolates. As such the resulting class leads to second order array in actual arrangement.

42 Second Zone

It has not been found till now convenient to utilize even the Second Zone. For, at this early level, the use of subject device to form Canonical Classes with the aid of bracketed notation is not found to be convenient.

43 Third Zone

The enumeration of the Canonical Classes in the Third Zone of the second order array is done on the basis of favoured category device. This has been done in most cases more or less helpfully. There is not much room for investigation in this Zone.

44 Fourth Zone

The isolates in the Fourth Zone of a second order array built on the basis of Canonical division has been worked out by what may be called "modified subject device". Generally speaking, modified subject device denies autonomy to classifier. It has to be worked out only by the classificationist. This is no doubt a weakness, but perhaps this is a case where too much of freedom might cause chaos.

45 Pseudo Fourth Zone

In some of the Main Classes, admitting of division on the basis of a personality characteristic at the very outset and not calling for division on Canonical lines, the notational device of CC creates an illusion. It happens as follows: The apparent second order array in such a case is very peculiar. The first zone does not really belong to the Second Order on account of its being made up of anteriorizing isolates. The Second Zone cannot be brought into use for the reasons explained in section 42. The Third Zone really belongs to the first order array of the first round first level personality facet. This is in the idea plane. But by convention the connecting symbol of this facet is to be omitted. Therefore these isolates appear in the notational plane as belonging to the second order depending on the Main Class concerned.

The Fourth Zone has another status. According to Rule 64 of CC, the last octave of the Fourth Zone becomes an amplifying facet. It represents a Special School of Thought pertaining to the Main Class. According to Rule 642, the isolate number of the amplifying facet is got by the chronological device, using the date of origin of the school of thought as the epoch. It is this notational device which produces the illusion referred to. For the first order array of the first round first level personality facet and the first order array of the amplifying facet occur in the notational plane as if the latter is a continuation of the former. Inspite of this illusion affecting the idea plane, the fact remains that the Third and Fourth Zones of the second order array, whose immediate universe is a Main Class, are freely utilized.

5 ARRAY IN FACET

We shall next consider the Zones in the arrays of different orders in the facets of different levels, different rounds of different fundamental categories, other than Space and Time.

51 First Order Array

As already indicated the very first facet, which is the first round first level personality facet stands alone. It has no First Zone or Second Zone or Fourth Zone. But the first order array of every other facet admits of each of its four Zones being utilized. The First Zone was, till a year or two ago, called pre-first octave. Its isolates are posteriorizing common isolates. These have been investigated in "An lib sc, 1" (1954). A summary of the results has been incorporated in Ranganathan's Report 4 of Fid/CC "General Theory of Classification". This report was published by Fid as document F 54-40 of 17 May 1954.

52 Second Order Array

Arrays of second and higher orders can have only three Zones. For, the First Zone has to accommodate anteriorizing common isolates. In fact this zone gets lifted from its own array and telescopes into the array of the next preceding order. We have found definite uses for the remaining three Zones. These are similar to the uses found for the corresponding Zones of the first order. These are as follows: The Second Zone receives isolates got by subject device and packeted notation. The Third Zone receives isolates based on characteristics special to the Basic Class. The

Fourth Zone accommodates isolates based on alphabetical and chronological devices. These are accommodated in the two last octaves according to the literary warrant pertaining to alphabetical and chronological isolates. These are fully discussed in section 3 and its subsections of "Depths classification (8)" (An lib sc, 2, 5-7).

6 SPACE AND TIME FACETS

In CC, the same connecting symbol is used for Space and Time Facets. The result is that the Zones of the First order array have to be shared by the isolates belonging to these two fundamental categories. The First and the Fourth Zones are given to Time Facet. The First Zone is occupied by isolates of private time. The Fourth Zone is occupied by isolates of public time. The Third Zone is given to Space Facet. We have not yet found use for the Second Zone. Nor we have found for the penultimate octave in the Fourth Zone. These are problems awaiting investigation.

61 A Suggestion

The division of the world based on subject device is now numbered by the digit 1 followed by the packet notation given by the subject device. It is for consideration if law of parsimony may not be satisfied by dropping the digit 1. This will no doubt be repugnant to the Canon of Helpful Sequence. For, the dropping of the initial digit 1 will take the isolate number away from the second order array and put it in the Second Zone of the first order array. The implication in the idea plane is the partial comprehension of the world based on a subject will have precedence over world itself. This is a violation of the Principle of Decreasing Extent. This point requires further consideration.

DEPTH CLASSIFICATION

11. SOIL : IS IT 'ENERGY' OR 'MATTER' OR 'PERSONALITY'?

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Examines 'soil' as a manifestation of one of the fundamental categories 'Energy', 'Matter' and 'Personality'. Shows 'soil' as a manifestation of Personality. As [1P1] is already used for accommodating agricultural crops, recommends [2P1] for soil qua soil.

0 INTRODUCTION

In my Classification of agriculture, published in Abgila, 1, 1949, 108-129, the personality facet was examined. The schedule of the foci in the first, second and third array of Personality was revised. Newer foci were added in the arrays of utility, part and crop which together give the crop focus. The farming facet was not examined. However the schedule of foci in this facet was also published with slight modification. Some new foci were also added. The farming facet requires a thorough check up in the light of the recent developments in the theory of classification. Some results of such a check up are given below. The first question examined is this. Of what fundamental category is soil a manifestation? Is it 'Energy or Matter or Personality?' To answer this, we have naturally to examine the concept 'soil'.

1 SOIL

Soil is an important entity in agriculture. During the last 50 years, considerable work has been done on it. As a result literature has accumulated on it. This discloses many of the proliferations of the concept 'soil'. Various attempts have been made to assess its nature and to define it.

2 DEFINITION

Soil is the cap or covering on the solid crust of the earths' landmass. It consists of:

1. Mineral matter - broken down rock materials of varying degrees of fineness.
2. Organic matter - contributed by dead plant and animal residues decayed and finally resolved to a semidecomposed black to brown amorphous powder called humus.
3. Living organisms - teeming millions of micro and macro plant and animal life.
4. Water in liquid and vapour state.
5. Gases.

These are in close association. They are subject to continuous interaction. They form a complex with specific physical, chemical and biological properties. 'Soil' denotes this complex. It provides mechanical support and nutrition to the plant. The material and vital constituents enumerated above are essential to soil. A substance in which even one of them is absent is not soil. Interaction between the material and vital constituents is spontaneous and ever-present. The term soil connotes also this, interaction as an essential characteristic.

3 ENERGY

We may first examine if, soil may be regarded as a manifestation of the fundamental category 'Energy'. From the published literature of the Indian school of thought on classification, the following enumerative description of the fundamental category 'Energy' can be composed: "a problem to be solved, a mode of work or approach, action, reaction, interaction, operation, way of manipulating, process, function and structure".

Section 2 has emphasised that 'soil' necessarily connotes "interaction". Therefore soil includes a manifestation of 'Energy'.

4 MATTER

We may next examine if soil may be regarded as a manifestation of the fundamental category "Matter". The only clue about the connotation of this fundamental category is found in Ranganathan's Optional facets (15), $\overline{W}$ Universe, Portion, constituent and organ. (Abgila, 3, 1953, 1-6). There we have the following statements.

1. Constituent $\subset$ ($\overline{W}$ neither having all the attributes of W other than quantity, nor distinctly associated with or uniquely specific to it.)

2. Constituent is a manifestation of the fundamental category 'Matter' woven into the personality of the universes under consideration.

According to this definition 'soil' includes the following as constituents or manifestations of 'Matter': mineral matter, organic matter, micro-organisms, water and gaseous matter.

5 PERSONALITY

The term 'Personality' and its connotation have not till now received as precise a statement as "Energy" and "Matter".

In his Library classification: fundamentals and procedure (1944), Ranganathan introduced the five fundamental categories for the first time. There he began the treatment of personality with the following words. "In the ultimate commodity which is the most concrete form of Matter, the individuating peculiarities are so many that it is more appropriate to group it with the category 'Personality', if we can, for want of a suitable terminology, force this word to represent not only human personality, but everything - Human, Animal, Vegetable or Inorganic or other categories like Languages and Religion - which have an individuality and aroma of their own "[Para 6 of Section 5144].

In his Philosophy of library classification (1951), which was written actually in 1948, the following additional elucidation occurs:

"The fifth fundamental category, Personality, which has to be used in a generalised sense as stated above, is unanalysable. We have to treat it gently and as a whole. It is the most concrete category". Section 2525.

In his lecture on Colon classification and its approach to documention, included in Bibliographic Organisation, papers presented before the Fifteenth Annual Conference of the Graduate Library School, July 24-29, 1950, (1951) ed. by J. H. Shera and M. E. Egan, he explained this term with a concrete example as follows:-

"Let me demonstrate with a concrete example, viz., Painting of iron signboards on the highways in the United States in 1950". Here

'1950' is the Focus in Time Facet.

'United States' is the Focus in the Space Facet.

'Painting' is the Focus in the Energy Facet.

'Steel' is the Focus in the Material Facet.

Of what fundamental category is signboard a manifestation? Surely it is not Time or Space, or Energy. It cannot be Matter either. No doubt steel was rightly regarded as a manifestation of Matter. But signboard is more than mere 'steel'. Steel has been impregnated with something intangible to make it a 'signboard'. 'Signboard' is indeed a manifestation of Personality. You see what I mean by Personality. Perhaps some of you may think of a better term to denote this intangible, subtle, unanalysable, holistic, fundamental category. But let us provisionally agree to denote it by the term 'Personality'. Highway Engineering is a manifestation of a still higher order of the fundamental category 'Personality'. Indeed it is the basic manifestation of Personality, the basic focus - which alone gives a meaning to all the other digits in the class number and all the other terms in the name of the specific subject". [Page 102].

In his Classification and communication (1951) 'Personality' is described as "that indescribably holistic something of which the other four are attributes".

Applying these ideas, 'soil' is a "holistic something" of which the manifestations of 'energy' and 'matter' mentioned in sections 3 and 4 are "attributes."

Therefore 'soil' is a manifestation of "Personality".

6 APPROACH TO SOIL

In agriculture, a study of soil *qua* soil without being related to any specific crop or group of crops precedes the study of a specific crop or group of crops. This is the case in text books too. The chapter on soil *qua* soil without being related to any specific crop or group of crops, precedes the chapters on a specific crop or group of crops. The courses of studies also follow the same sequence. Thus the traditional or canonical approach demands that in the arrangement on the shelves and in bibliographies, literature on soil *qua* soil, without being related to any specific crop or group of crops, should be placed anterior to that on any specific crop or group of crops.

7 1P1

In agriculture, crop is undoubtedly the personality *prima facie*. Therefore the several crops have been accommodated in [1P1].

It is concluded above that soil is also a manifestation of [P]. By assumption [1P2], [1P3], 1P4 etc., are to accommodate only levels or organs of any remove of [1P1]. Soil is not a level or organ of a crop of any remove. It has been established in the *Optional facets* (15) in the *Annals* part of *Abgila*, 3, 1-6, that [1P2], [1P3] etc., should accommodate organ of successive remove, of the isolate in [1P1]. Therefore, soil cannot be [1P2], [1P3] etc. Hence soil has to be accommodated in later rounds.

8 1E

Let us examine if soil is germane to any one of the foci in the [1E]. Consider isolate number 1. This is denoted in the verbal plane by the term "soil-ing". But it is a term denoting action. The dictionaries provide the following meanings denoting action: making dirty, smear, tarnish, defile, to feed cattle on fresh cut green fodder, to supply or treat land with dung or fertilising matter (obs), to amnure (obs). None of these meanings meet the requirements of the present context. We want a word which denotes "action of providing with helpful soil". This is not available. The difficulty is therefore in the verbal plane and not in the idea or notational plane. The solution should therefore be sought in the verbal plane. We may coin a new word for this. But we may provisionally use the term "soil-ing" as the substantive term for the energy isolate number 1 to denote "action of providing with helpful soil". Accordingly:

J:1 soil-ing (Action of providing helpful soil).

Thus soil is germane to isolate number 1 in the [1E] and can be accommodated in [2P1]. The facet formula for soil will thus be:

J:1 [2P1].

The facet formula for a book on crops will be:

J [1P1].

The first digit J is common to both the facet formulas. The second digit in the case of soil is ':'. But the second digit in the case of a crop will be an arabic numeral. By assumption the ordinal value of : is less than any of the arabic numerals 1 ... 9. Therefore the facet formula for soil will precede the facet formula for a crop. Literature on soil *qua* soil will be anterior to literature on any specific crop or group of crops. This satisfies the requirements of traditional or canonical approach.

CORPORATE AUTHOR

1. CONCEPT

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First of a series of papers as a basis for the discussion of the Ifla to arrive at international agreement on corporate body - Heading. As the starting point, gives a precise definition of "Corporate Body" and of its four species, "Government", "Institution", "Conference" and "Organ". Defines also author and gives criteria for distinguishing between "Personal Author" and "Corporate Author".

0 CONTRACTIONS USED

The following contractions are used throughout this series of papers:

ALA	"ALA cataloguing rules for author and title entries," prepared by the Division of Cataloguing and Classification of the American Library Association, ed by Clara Beetle, ed 2, 1949. (Ed 1, 1908).
CCC	"Classified catalogue code" by S R Ranganathan, ed 3, 1952. (Ed 1, 1934; ed 2, 1945).
"Fundamentals"	"Library catalogue : Fundamentals and procedure" by S R Ranganathan, 1950.
PIN	"Prussian instructions : Rules for the alphabetical catalogues of the Prussian Libraries", tr from ed 2 1908 .... by Andrew D Osborn, 1938. (Ed 1 of the original, 1899).
RDC	"Rules for a dictionary catalogue" by Charles A Cutter, ed 4, 1904. (Ed 1, 1876 : ed 2, 1889 : ed 3, 1891).
"Therory"	"Theory of library catalogue" by S R Ranganathan, 1938.
VAT	"Rules for the catalogue of printed books", tr from ed 2, 1939, by Thomas J Shanahan etc., ed by Wyllis E. Wright, 1948. (Ed 1 of the original 1930).

1 THE PAST

The concept of Corporate Authorship has been slow in emerging. RDC was one of the first codes to popularise this concept. Its definition of "author" includes "Bodies of men (societies, cities, legislative bodies, countries) are to be considered the authors of their memoirs, transactions, journals, debates, reports, etc". PIN represents the opposite school of thought. It insists that "names of persons, official bodies, corporations, etc, at whose instigation or with whose support the work has originated are disregarded". However, there is now said to be a school of cataloguers in Germany willing to accept the concept of Corporate Authorship. There thus appears to be some chance for this concept to be applied in every national code.

2 LOOSENESS OF TERMINOLOGY

The problem is not however free from difficulties. All the catalogue codes are not in agreement in the choice and rendering of the name of a corporate author in the heading of a catalogue entry. Some of the differences are traceable to looseness in the concept of Corporate Authorship. Most codes evade the definition of "Corporate body" and "Corporate author". A precise definition will eliminate some of the differences. At any rate, the first step in arriving at a rule on the subject for incorporation in an International Catalogue Code should be to arrive at an agreed definition of the terms involved. Successive attempts at precise definition have been made in the CCC and in the "Theory". A further step has been taken in my recent book, "Heading and Canons : Comparative study of five catalogue codes", 1955.

3 LEGAL CONVENTION

Long before cataloguing convention felt the need for the concept of Corporate Author, both municipal and international law had extended "Legal person" beyond a single human being. It had recognised State, Corporation, Institution, Church, Mosque, Temple and Idol as legal persons. Enacted laws have defined such a Corporate Legal Person. They have laid down that a Body Corporate can hold property, can sue and can be sued in a court of law.

31 Cataloguing Convention

Similarly in Cataloguing Convention, a Body Corporate can be author of a document; it can also be a collaborator, such as editor or translater of a document; it can even be the subject of a document. The first step proposed to be taken by Ifla to promote international agreement on cataloguing rules is the examination of the concept of Corporate Authorship. This was decided at its meeting at Zagreb in September 1954. As a basis for the discussion of Ifla, a set of provisional draft definitions is given here.

4 CORPORATE BODY

Corporate Body:- A number of persons taken collectively -- usually as united, or organised, or coming together informally, in a common cause or for a common action, such as government business, or commercial or industrial or any other business, or deliberation, or collective expression of opinion or statement.

A corporate body may be:- - 1 a government including a local body; or 2 an institution; or 3 a conference including a casual or informal meeting; or 4 an organ of any of the above.

41 ORGAN

Organ of a corporate body:-- Non-autonomous part of a corporate body established either by

1 the constitution of the body; or

2 executive or administrative measure for administrative work for an indefinite period, within the field of the function of the corporate body; or

3 legislative or executive or administrative measure for a specific work of a limited duration.

Constitutional Organ:- Category 1 mentioned above.
Administrative Organ:- Category 2 mentioned above.
Permanent Organ:- Category 1 or 2 mentioned above.
Temporary Organ:- Category 3 mentioned above.
Organ of First Remove:- Organ intrinsic to the consitution of the corporate body.
Organ of Second Remove:-Department of any organ of the first remove, non-autonomous and administrative.
Organ of Third Remove:-Non-autonomous administrative division of any administrative department.

And so on.

42 Government

Government:- 1 Government with full or limited sovereign power. It generally has functions of execution, legislation, judiciary, and administration. Other functions such as defence, taxation, regulation of commerce will vary with the limitation of sovereign power, or

2 Local Authority in charge of the regulation, promotion and/or provision of local public services, under power delegated by the government within the territory of which its locality lies, and with a defined extent of autonomy.

43 Institution

Institution:- Independent or autonomous corporate body other than government. It may be created by a government or constituted under a law, or formed voluntarily — either formally or informally. It should have continued existence and functions beyond that of merely convening a conference.

44 Conference

Conference:- Meeting for deliberation, or formulation and expression of opinion or sentiments, not convened by any single government or to form a government, or by any single institution or to form an institution; or jointly by more than one of them and not confined to the members of such corporate bodies, but convened and conducted either spontaneously or by a body which has no existence beyond the conference convened and held by it or whose primary function is only that of convening or holding such conferences at intervals.

None of the catalogue codes except CCC has attempted an explicit definition of the above terms. They are taken as if they are "assumed fundamental terms which have the same meaning for all in common usage". This is one of the root causes of the differences between the various catalogue codes.

5 AUTHOR

The term "author" is basic in cataloguing. And yet, its definition is vague in most of the catalogue codes. This vagueness accounts for even more differences between the various catalogue codes in the determination of the "author" of a work, not only when it is of corporate authorship but even when it is of personal authorship. Here are the vague definitions:-

RDC:- Author, in the narrower sense, is the person who writes the book; in a wider sense, it may be applied to him who is the cause of the book's existence by putting together the writings of several authors (usually called "the editor", more properly to be called the "collector".)

Bodies of men are to be considered as authors of works published in their name or by their authority.

PIN does not define the term "author".

ALA:- A corporate body may be considered as the author of publications issued in its name or authority.

Evidently, RDC is the source for this faulty wording. However, ALA seeks to minimise the danger of the flood-gates being opened in this way, by putting a dam in paragraph 2 of its rule 71:- Monographic works by individual officials, officers, members and employees of corporate bodies, when these works are not clearly administrative or routine in character, are preferably to be entered under personal author, even though issued by the corporate body.

This is a partial and a hasty adoption of the specification in "Theory". The half-hearted nature of its adoption is indicated by ALA's flooding itself with quite a number of rules to spell out its implications. These rules are 73C; 75C-D; 84C-D; 89C, E, H; 90A-B and 118A.

VAT:- Corporate bodies, national and local administrative bodies, ecclesiastical authorities, associations, and institutions are considered the authors of the publications emanating from them or containing acts and documents belonging to them.

The terms "emanating from" and belonging to" are too vague for consistent application.

This accounts for the confusing numerousness of the rules on the choice of author heading found in most codes. The CCC has nearly avoided this fault. It may be profitable for the

Ifla to decide this issue as a preliminary measure. The following draft definitions are put forward as a basis for discussion by Ifla.

Definition

Author of a work:-

1 Person creating the work; or
2 Corporate body owning responsibility for the thought and expression constituting the work.

51 Personal Author

Personal Author:- Person as author, the responsibility for the thought and expression in the work resting solely on his private capacity and not on the capacity of any office he may hold within a corporate body, nor on the corporate body.

52 Corporate Author

Corporate Author:- Corporate body as author, the responsibility for the thought and expression in the work resting solely on it and not on personal author(s).

6 PERSONAL vs. CORPORATE AUTHOR

The implementation of the above definition is often rendered difficult by the occurrence of ambiguity or indefiniteness in the author-statement given on title-page. Some elucidation is necessary to escape the confusion caused by such ambiguity. This was first attempted in Chapter 54 of "Theory". Here is a re-statement of it.

61 Certainty of Personal Authorship

If the title-page mentions the name(s) of person(s) only in the place usually giving the name of author and does not indicate the name of any corporate body other than the one belonging to the publishing trade mentioned in the imprint, the work in the book is of personal authorship. There is no alternative to be considered.

62 Certainty of Corporate Authorship

If the title-page does not mention the name of a person in the place giving name of author but indicates somewhere in itself the name of a corporate body other than a body belonging to the publishing trade mentioned in the imprint, the work in the book is of corporate authorship, provided that even in the latter case it is of corporate authorship, if it is a work by or on the corporate body itself, such as its catalogue, administration report, history, and so on.

63 Ambiguity in Title-Page

If the title-page indicates the name of a corporate body other than a body belonging to the publishing trade mentioned in the imprint, and also the name(s) of person(s) in the place usually giving the name of the author, there is ambiguity. Judgment is then necessary to determine the correct author — personal or corporate. The two succeeding sections give some guidance to judgment. Cases may arise exceeding the capacity of this guidance. Future experience alone will help us to make the guidance sharp enough to meet such refractory cases.

631 Corporate Authorship

The work in a book is of corporate authorship, if it is of a deliberative, legislative, directive, judicial, administrative or routine character limited by the purpose or function or outlook of the corporate body. The mere fact that a book is published, financed, aided, approved, or authorised by a corporate body is not sufficient reason to deem it to be of corporate authorship, and not to be of personal authorship.

632 Personal Authorship

The work in the book is of personal authorship, if its primary function is the extension of the boundary of a field of knowledge or its intensification, and the responsibility for the thought and the expression of it rests on the person and not on the office held by him in the corporate body, in spite of his being a paid or an honorary employee or a member of the corporate body. The mere mention of the personal name of an official of the corporate body in the place in which author's name is usually mentioned, is not sufficient reason to deem it not to be of corporate authorship, but to be of personal authorship.

7 PARENT BODY vs ORGAN

The implementation of the concept of "Corporate authorship" is beset with another difficulty. A personal author has only one brain to create the thought-content of his work. He has further only one tongue to express the created thought so as to make it communicable. But, it is not so in the case of a corporate body. It is, as if it were multi-headed. Each head has its own brain and its own tongue. There is a main head which may be taken to correspond with the corporate body as a whole. To every organ of it, corresponds a separate head. In a work of corporate authorship, it is not sufficient to know the name of the corporate body. It is also necessary to know if the corporate body as a whole is the author or if any of the organs is the author. This is a problem peculiar to corporate author; it does not arise in personal author.

71 Ascertainability

When the title-page has been well drafted, the Canon of Ascertainability will, by itself, decide whether the author of a work is the parent corporate body or any of its organs.

72 Bad Draft

But the title-page might have been carelessly drafted. Only an organ of an earlier remove, than the strict organ-author, might have been mentioned. In most of these cases, a perusal of the introduction, preamble, letter of transmittal or in rare case, a glance through the whole document may decide the issue. This would involve of course a considerable wastage of man-power. This is avoidable.

73 Standard Practice

The means to avoid it is to set up a standard practice for the title-page and its overflow, for a work of governmental, institutional or conference authorship. Works of governmental authorship are in the hands of a paid staff of high calibre. Conformity to standard may not be as difficult in their case, as in the case of the other two kinds of corporate authorship. Standardisation of title-page will give great relief. Its example will make the other types to fall in line. In the interest of overall national and international economy, the International Standards Organisation and the various national Standards Bodies should establish a standard practice for the author statement in the title-page of documents of corporate authorship.

8 GOVERNMENT vs INSTITUTION

Several institutions are government-owned or nearly so. Some of these are autonomous. Some are managed directly by government as if they were departments or other organs. There are all possible grades of transition from an unmistakable organ of government to an independent institution. Now and again, there is also shift of the same institution in course of time from the status of independent institution to any status short of an unmistakable organ. A useful test is this:-

Organ of first remove is usually mentioned in a modern written constitution. On the analogy of this, organ of first remove of a nation with unwritten constitution may be recognised.

Another fact has to be remembered. There is tendency for the state to take up more and more functions, beyond the traditional and primary ones of government, execution, legislation, defence, judiciary and administration. It takes up many service functions, such as

1 Construction and maintenance of highways, bridges, harbours, air-ports and such other essentials of transport;

2 Astronomical and meteorological observations through its own observatories;

3 Communication systems such as rail-

ways, tramways, bus system and air ways, postal, telegraph, telephone, wireless and radio services;

4 Healing the sick and wounded through its own hospitals and its own sanatoria;

5 Teaching through its own schools, colleges and universities; and

6 Banking service through its own banks; etc. Except perhaps the first mentioned above, the others are not included among primary functions.

For works bearing on the discharge of primary functions — administration reports, reports of deliberation, direction, and so on and in general for thought created and expressed by an organ of government of first remove, second remove etc. as defined in section 41, the government or its appropriate organ, as the case may be, should be taken as its author.

Any autonomous or non-autonomous organisation, engaged in the work of research, production, commerce, and supply of commodities and services to the public, is deemed to be the author, as an institution, for all works containing thought and expression created by it. It is so even if the institution is owned and managed by the government.

But for such convention, most institutions will come into the category of governmental body, as the state progresses along lines of socialisation. In a truly totalitarian state, there can be no corporate body other than governmental one. To break up this octopus-type of governmental authorship, cataloguing convention distinguishes between an organ of government and an institution along lines mentioned above.

The above-mentioned criterion to distinguish between governmental and institutional authorship will be sufficient in most cases. But there will occasionally be refactory cases baffling this criterion. No help except the personal judgment of the cataloguer will be of avail in such cases. By a periodical review of such elusive cases, the criterion can be made progressively sharper.

91 INSTITUTION vs INSTITUTION

The choice between a parent institution or one of its organs on the one side, and an autonomous affiliated institution on the other, in the claim to be deemed as author of a work, should be decided along lines analogous to the choice between the claims of government and institution, set forth in section 8.

92 SYNOPSIS

This section gives, for ready reference, a synopsis of the cataloguing conventions more or less stabilised at present, in deciding the nature of the corporate body to be deemed the author of a work parent body or an organ of it on the one side, and a dependent or affiliated institution on the other side.

GROUP 1

Each of the following institutions should be taken as author of its works, as if it were independent of the parent body, if any exists, be it government or institution:-

Abbey
Bank
Board of Trade
Cathedral
Cemetery
Chamber of Commerce
Church (place of worship)
College
Convent
Endowment
Firm
Foundation
Guild
Masonic Body
Monastery
Mosque
Mutt
Part
Political party
Post Office
Produce Exchange
Religious Order
School
Stock Exchange
Telegraph Office
Telephone Exchange
Temple
University

GROUP 2

Each of the following institutions should be taken as author of its works as if it were independent of the parent body, if any exists, be it government or institution, provided it has a distinctive name:-

Botanical Garden
Chapel
Experimental Station
Exhibition
Festival
Hospital
Laboratory
Library
Museum
Observatory
Shop
Zoological Garden

If any of the institutions has no distinctive name, it should be treated as an organ of its parent body.

CORPORATE AUTHOR 1

GROUP 3

Any formal or informal group of the members of a parent body formed for recreative, ameliorative or any other economical or social purposes other than any forming a distinctive purpose of the parent body should be treated as an organ of the parent body even if it has a distinctive name.

GROUP 4

Each section or branch of an institution should be taken as author of its work, provided it has a distinctive name not involving the name of the parent body.

If a section or a branch does not have a distinctive name not involving the name of the parent body it should be treated as an organ of the parent body.

GROUP 5

Each international institution or conference — isolated or continuing, — of private persons, non-governmental institutions or national governments should be taken as author of works produced as a result of its deliberations.

CATALOGUING A COMPOSITE BOOK

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Demonstrates cataloguing of a composite-book of a complex type by Ccc.

0 INTRODUCTION

It is proposed to demonstrate cataloguing of a composite book by Ccc and incidentally to comment on some of the rules provided in Ccc.

1 PROBLEM-BOOK

The title-page of the book is as follows:

> The Serpent Power / Being the / Shat-Chakra-Nirupana and / Paduka-Panchaka / Two works on Laya Yoga, Translated from the Sanskrit, with introduction and commentary / By / Arthur Avalon / (Sir John Woodroffe) / (Fourth Edition) / Publishers / Ganesh & Co. (Madras) Ltd. / 1950.

There is also another title-page:

> Tantrik Texts / Edited By / Arthur Avalon / Vol II/- / Shatchakranirupana / and / Padukapanchaka / Revised with Variant Readings / Edited By / Taranatha Vidyaratna / Publishers / Ganesh & Co. (Madras) Ltd. / 1950.

2 ANNOTATION

21 Annotation 1

The following are the extracts from the book giving us the necessary information:

(1) Extract from Contents

CONTENTS

		Page
Preface		v
Note to Second Edition		ix
Introduction		
I	Introductory	1
II	Bodiless consciousness	25
III	Embodied consciousness (Jivatma)	49
IV	Mantra	83
V	The Centres or Lotuses (Chakra, Padma)	103
VI	Practice (Yoga:Laya-Krama)	181
VII	Theoretical Bases of this Yoga	257
Text (Translation):		
	Description of the six centres (Shatchakra Nirupana)	317
	The Fivefold Footstool (Paduka-panchaka)	489

(2) Extract from Preface

P. V "Shatchakranirupana"...has as its author the celebrated Tantrik Purnananda

Svami, a short note on whose life is given later. It forms the sixth chapter of his extensive and unpublished work of Tantrik ritual entitled "Shritattva-Chintamani". "This has been the subject of commentaries by among others Shangkara and Vishvanatha cited in Volume II of the Tantrik Texts." "The commentary here translated from the Sanskrit is by Kalicharana."

P. VII "The colophon states that Jagadananda Sharma wrote the Purana in the Shaka year 1448". This Jagadananda assumed the name of Purnananda when he obtained his Diksha." "...and compiled several Tantrika works, of which the Shritattvachintamani composed in the Shaka year 1499 (A. D. 1577), etc. are known". "The Shatchakranirupana here translated is not however an independent work but a part of the sixth 'Patala of the Shritattvachintaman."

(3) Translation of the colophon at the end of commentary in Shat-Chakra-Nirupana, P. 488.

"Here ends the Eighth Section of the Explanation of the verses descriptive of the Six Chakras, forming part of the Shritattvachintamani, composed by Shri-Purnandayati"

(4) Translation of the colophon at the end of Commentary on Padukapanchaka P. 508 "End of the commentary (Tippani) of the name of Amala (Stainless), written by Shri Kalicharana on the Padukapanchaka Stotra."

(5) (Page 5 of Tantrik texts V. II) Preliminary verse

Pratanyate shriyuthashangkarena shatchakra

tikakhyasupusthikeyam

(6) (Page 94 of Tantrik Texts V. II) Colophon at the end of Kalicharana's commentary (Tr. given above in 3)

(7) (P. 107 of Tantrik Texts V. II colophon at the end of Kalicharana's commentary.) (Tr. given above in 4)

(8) (P. 109 of Tantrik Texts V. II)

Shatchakravivrutihi (Vishvanathakrutha)

(9) (Page 142 of Tantrik Texts V. II)

Baladevatikakaradruthaha shatchakranirupanasya-

dhikaha shlokaha

22 Annotation 2

The book consists of two parts as indicated by the two title-pages. In fact, it consists of many parts.

The first, Serpent power has as its constituent parts -- (1) Introduction, Pp. 1-315 (2) Translation of Shat-Chakra-Nirupanam (3) Translation of Kalicharana's commentary on Shat-Chakra-Nirupanam (4) Translation of Paduka-Panchakam and (5) Translation of Kalicharana's commentary on Padukapanchaka. The introduction is not just an introduction to the two works on Laya-Yoga, but is an important contribution to the subject. Hence, we recognise it as a constituent part. All these constituent parts have a common title viz. Serpent power etc. The whole, therefore, is recognized as an Ordinary Composite Book (Rules 0841, 08411 of Ccc).

The Second Part indicated by the second title-page is an Artificial Composite Book (Rule 08412). It has as its constituent parts -- (1) Purnananda:Shat-Chakra-Nirupanam. (2) Kalicharana: Commentary on Shat-Chakra-Nirupanam. (3) Shangkara: Commentary on Shat-Chakra-Nirupanam. (4) Padukapanchakam: Commentary on Shat-Chakra-Nirupanam. (5) Kalicharana: Commentary on Padukapanchakam and (6) Vishvanatha: Shat-Chakra-Vivruti.

3 ENTRIES

31 Main Entry

△ 22 JO Composite Book

AVALON (Arthur). Pseud (i. e. John Woodroffe.). Ed.

Serpent power being the Shat-Chakra-Nirupana and Paduka-Panchaka, two works on Laya Yoga, etc. Edn. 4.

2. Purnananda: Shat-Chakra-Nirupanam, ed. by Taranatha Vidyaratna (Tantrik texts, ed. by Arthur Avalon, 2). (Extract from Purnananda: Shritattvachintamani, Chap. 6). △22x1 15JO
3. Kalicharana: A commentary on Shat-Chakra-Nirupanam (Tantrik texts, ed. by Arthur Avalon, 2). △22x1, 1 15JO
4. Shangkara: Shat-chakra-Bheda-Tippani. (Tantrik texts, ed. by Arthur Avalon, 2). △22x1, 2 15JO

5. Vidyaratna (Taranatha). Ed. :Padukapanchakam. (Tantrik texts, ed. by Arthur Avalon, 2). △22x2 15JO
6. Kalicharana: Amala, a commentary on Padukapanchakam (Tantrik texts, ed. by Arthur Avalon, 2). △22x2, 1 15JO
7. Vishvanatha: Shat-Chakra-Vivruti. (Tantrik texts, ed. by Arthur Avalon, 2). △22x1, 3 15JO

73259

32 Contributor Index Entry

PURNANANDA.
Shat-Chakra-Nirupanam tr. by Arthur Avalon.
Forming part of
Avalon, Pseud: Serpent power. △22 JO

4 BACK OF THE MAIN CARD

△22x1:9		SPIRITUAL EXPERIENCE.
△22x1:9		HINDU. SPIRITUAL EXPERIENCE.
△22x1	15JO	HATHA YOGA.
△22x1, 1	15JO	SHAT-CHAKRA-NIRUPANAM.
△22x1, 2	15JO	SHAT CHAKRA BHEDA-TIPPANI.
△22x1, 3	15JO	SHAT-CHAKRA-VIVRUTI.
△22x2	15JO	PADUKA PANCHAKAM.
△22x2, 1	15JO	AMALA

AVALON (Arthur). Pseud. Ed.
AVALON (Arthur). Pseud. Tr.
AVALON (Arthur). Pseud. Tr.
KALICHARANA.
PURNANANDA.
AVALON (Arthur). Pseud. Tr.
KALICHARANA.
AVALON (Arthur). Pseud. Tr.
PURNANANDA.
VIDYARATNA (Taranatha). Ed.
PURNANANDA.
KALICHARANA.
SHANGKARA.
VIDYARATNA. (Taranatha). Ed.
KALICHARANA.
VISHVANATHA.
TANTRIK TEXTS.
WOODROFFE (John).
SHARMA (Jagadananda).
AVALON (Arthur). Pseud. Ed.
MYSTICISM.
LAYA YOGA.

5 COMMENTS

51 Comment 1

Constituent works 2-7 belong to the same series. But we cannot give the Series Note only at the end of the Main Entry. If we give the Series Note at the end of the Main Entry, it would mean that all the constituent works belong to the same series. To avoid this confusion, we have to repeat the same Series Note after each of the constituent works.

The following amendment is suggested to meet this situation.

Replace Rule 6214 by the following:

6214 If some or all of the constituent works belong to the same series, a note need not be written in the section for each constituent work. It is sufficient if a single note is added as the final section, the name of the Series being preceded by the numbers of the constituent works belonging to that series and the Serial Number part of the section consisting of the successive Serial Numbers.

52 Comment 2

In the Contributor Index Entry (See above) the name Arthur Avalon appears in the title-portion as a collaborator. This is a pseudonym, but Ccc does not provide any rule for indicating this fact. The following new rule is suggested:

13210 The name of the collaborator is to be followed by the connecting word 'or' or 'i. e.' and then by the other name by which the author is known.

53 Comment 3

In the case of a Simple book the Leading Section of the Cross Reference Entry is occupied by a Class Number. Rule 161 Section 1, therefore, mentions only the Class Number. An Artificial Composite Book, however, requires, in addition to the ordinary Cross Reference Entry, Special Cross Reference Entry (or Entries), which have in its Leading Section the Call Number of the Constituent Work.

Therefore, the Back of the Main Card given in Section above gives in the left half the Class Numbers and Call Numbers which form the Leading Section of the Cross Reference Entries.

Incidentally, the definition of the Cross Reference Entry should be amended so as to cover both types of Entries.

SURVEY OF LIBRARIES IN AUSTRIA

J. MAYERHÖFER

National Library, Vienna

Shows the various stages of development of libraries. Gives an account of monastic libraries; private libraries, national library, university libraries, research libraries, popular libraries, and the Association of Austrian Librarians. Mentions the range of Indology collections in Austrian Libraries.

0 BACKGROUND

For more than a thousand years Austria has been in possession of libraries. They date back to the earliest Middle Ages and their beginnings are closely connected with the history of settlement of that part of Central Europe which later was to be named Austria. Today Austria is no longer a big power, but the fact that it is situated in the heart of Europe has linked up its fate with that of all the other European nations. As Austria has no natural boundaries towards the East, the sphere of influence of Eastern cultures which have been in existence for thousands of years always extended to central Europe. Even in antiquity, what is Austria today, was a bulwark of the Roman Empire. As soon as the storm of the migration of the nations had passed over it, it was again settled from the West. Peasants immigrated from the adjacent parts of Germany, but the representatives of spiritual culture frequently were monks from foreign countries. As Christianity was spreading the monks who migrated from Ireland, England or Scotland, brought with them a highly developed writing art and library culture. Very early they founded monasteries with libraries. Already around 700, a Benedictine monastery was founded at Salzburg, in 777 another at Kremsmunster, to mention only a few. More monasteries were founded in the 12th century in connection with the beginning and growth of the Cistercian Order.

1 MONASTIC LIBRARIES

The monastic libraries were of varying importance for the library history of the country. During the later Middle Ages and the Reformation they were in the background, but flourished a second time in the 18th century, when numerous monastic libraries were adorned with magnificent baroque reading halls, which often are the architectural pride of these monasteries even today. This late second flowering period of the monastic libraries is all the more remarkable as it occurs when the Age of Enlightenment has almost started during which a number of monasteries were dissolved. Generally speaking we can say that the monastic libraries have weathered all the storms of history up to the present. They often comprise more than 1, 00, 000 volumes, and thus represent a remarkable and often very valuable property. Any research worker is admitted to use the library on application, but the number of interested persons is naturally not very large. Also it is difficult for the libraries to purchase modern literature.

2 PRIVATE LIBRARIES

As a next type of library we may mention the private libraries of the princes. Here we are concerned mainly with the House of the Hapsburgs because compared to them all the others were of minor importance. The Hapsburgs were eagerly collecting books as early as the 14th century. Duke Albrecht III (1395) had books copied and adorned with paintings. One of these manuscripts is now a specially valuable piece in the collections of the Austrian National Library. Such manuscripts, however, are not regarded as part of a library in our modern sense, but as a rare gem, and they are kept with the princely household treasures. The Emperor Maxmilian I (1519), one of the most outstanding Hapsburgs, gathered many learned scholars at his court, and also wrote himself. He strongly promoted the art of printing which had just been invented and also made use of it for his purposes. Yet he cannot be called the founder of a library, although he certainly owned many books, because he had no residence. Only under Emperor Ferdinand (1564) Vienna became the imperial residence. This was the first step towards an imperial court library, the later Austrian National Library. Under Maximilian II (1576) for the first time an imperial librarian is mentioned who was in charge of the library, which then comprised 3000 volumes. Books began to be bought systematically, especially oriental books, by intervention of the imperial emissary to the court of Turkey. Besides these, ever since the invention of the printing press, the library received the presentation copies which had to be submitted in order to obtain a copyright; moreover (theoretically) since the Reformation every book had to be submitted for censoring.

3 IMPERIAL LIBRARY

During the 16th and 17th centuries Vienna and Austria were in constant danger from the Turks. The Turks, after the conquest of Constantinople (1453), gradually took possession of the whole Balkan peninsula and reached the gates of Vienna, which they besieged twice. Vienna was then regarded as the bulwark of the Christian Occident, and was freed from the second siege by a coalition army. The victory over the Turks was followed by a general material boom, which was beneficial also in a cultural respect. Besides many other palaces, a suitable building was at last erected for the Imperial Library (1723-1726). This truly imperial building is said to be the most beautiful baroque library in the world, and one of the most beautiful and largest architectural creations in the history of art. It is designed by Johann Bernhard Fischer von Erlach. When the building was completed the library comprised about 90,000 volumes. Today the hall houses about 200,000 volumes which, however, is less than one seventh of the total. Most of the books are kept in stack rooms which since the end of the last century have been constructed underneath the state room, partly above and partly below street level.

The library was named National Library after the end of the first world war, when the Hapsburg Empire ceased to exist and Austrian National Library after the end of the second world war in 1945.

4 UNIVERSITY LIBRARIES

Austria's oldest University Library is that of the Vienna University. The University was founded in 1365, and shortly afterwards the Library was partly taken over by the Jesuits who set up Faculty Libraries and closed the main Library. The books were transferred to the Imperial Library. However, twenty years later, the University Library again came into existence. Today the University Library with its one and a half million books comes next only to the Austrian National Library, although it does not include equally valuable collections of manuscripts, incunabula, autographs, portraits, etc.

The Graz University Library was founded in 1586 during the Counter Reformation. Innsbruck University Library was started only in 1745 under the famous Empress Maria Theresa.

5 RESEARCH LIBRARIES

Today Austria is a federal state consisting of 9 provinces. In those of the provinces which do not possess a university so-called Research

Libraries were established. These libraries are also the regional depots for copyright copies, while the Austrian National Library is the only library to receive and store all the copyright copies of the country. It is worth noting that in Austria the University Libraries not only serve the professors and students, but like all large libraries in Austria, including the National Library, they are accessible to anybody who is interested, and practically for the asking. The establishment of the Research Libraries and their common administration dates back to 1848.

Apart from university and research libraries, various specialised establishments of university level have their own libraries. Veterinary High School (1777), Academy of Fine Arts (1774), Technical High School, Vienna (1815), Technical High School, Graz (1865), Mining Engineering High School, Leoben (1849), Agricultural High School (1872), School of International Trade (1897), Academy of Music and Dramatic Art (1309).

It is not possible to discuss in detail the numerous other scientific libraries of Austria in this paper. Among them are : the Library of the National Council, the Library of the Federal Chancellary, the libraries of the ministries, of the Patent Office, the Academy of Sciences, and many others. Each has a collection of more than 1,00,000 volumes. Together with the larger popular libraries they are given in the "Verzeichnis österreichischer Bibliotheken" (List of Austrian Libraries), Vienna 1913, (Biblos-Schriften, vol. 1).

6 POPULAR LIBRARIES

Popular Libraries were founded only around the middle of the 19th century (Michael Stickler, Die osterreichische Volksbuchereibewegung. In: Biblos. Jg. 3(1954), H. 3. S. 92-103). Until after the first world war, Austrian Popular Libraries, Workers' Libraries, and also larger library associations aiming at adult education. In the thirties the Workers' Libraries were transfered to the local authorities. Since then they are similar to American public libraries. The largest local popular library system is that of the Municipal Libraries in the capital of the federation, Vienna. It has at present 44 branches and about 2,65,000 volumes. There is a network of Catholic Popular Libraries which in

ries, consisted of (Roman Catholic) Parish Libraries, Workers' Libraries, and also larger library associations aiming at adult education. In the thirties the Workers' Libraries were transfered to the local authorities. Since then they are similar to American public libraries. The largest local popular library system to that of the Municipal Libraries in the capital of the federation, Vienna. It has at present 44 branches and about 2,65,000 volumes. There is a network of Catholic Popular Libraries which in

Vienna alone comprises 126 libraries with altogether 1,00,000 volumes. The popular libraries in Austria are growing and are further promoted by the State. But many more improvements are necessary, because only a small number of the popular library workers are trained librarians, and many work as librarians on a purely honorary basis.

The last world war did not do very much harm to Austrian libraries. The Vienna University Library suffered most, it lost about 50,000 of its volumes which had been brought to a place where they were safe from bombs, but eventually suffered due to the occupation of Austria.

The main problem Austrian libraries have to face is the generally difficult financial situation after the war, which afflicts all the cultural institutions. However, recently public opinion underwent a change, and the libraries can expect sufficient means for the purchase, handling, and storing of the books, which will permit them to make vast improvements.

7 REORGANISATION

With regard to the collaboration of the Austrian libraries, the setting up of an Inspector General's Office of Austrian Scientific State Libraries was one of the outstanding achievements in the history of Austrian libraries. Prof. Dr. J. Bick, Director General of the Austrian National Library was the first to hold this office, and he made the following innovations already in the years between the two world wars:- (1) Consolidation of all scientific libraries under the Education Ministry to a system within which transfer of personnel is possible; (2) standardised training of librarians; introduction of a state examination for all academical and middle grade librarians; (3) standardisation of indexing rules for all the above mentioned libraries by following the instructions for the alphabetical catalogues of the Prussian Imperial Libraries on which the German Union Catalogue was based.

8 LIBRARY ASSOCIATION

After the second world war, the Association of Austrian Librarians was also revived which followed the traditions of the association which has been founded in 1896 as one of the world's oldest library associations. Since 1950 Librarians' Conferences have been held every two years (1950 at Salzburg, 1952 at Graz, 1954, in Vienna). Since 1954 technical periodical "Biblos" is published covering library science, documentation techniques, etc.

For Popular Libraries there is no library association. However, there is a joint organisation of Popular Libraries instituted by the Education Ministry, which also holds public conferences. The publication of the Public Libraries is the New Adult Education (formerly Book and Library). A Popular Library law is planned in addition to a general adult education law.

9 INDOLOGY COLLECTIONS

We shall finally mention some Indian literature collections in Austrian libraries. Vienna has always been a centre of study of oriental history, cultures, and languages. On account of close diplomatic ties and trade relations between Austria and the Near East and especially Turkey, there has always been a keen interest in Arabic, Persian and Turkish. Well known scholars taught these subjects at the University of Vienna and the Imperial Library, — the present Austrian National Library — which could therefore collect a large number of valuable manuscripts and all the important publications.

Indology was also a great favourite in Vienna from the earliest times onwards. Fredrich von Schlegel, founder of Indology in the German language area, carried on his work in Vienna after 1808. The Manuscript Collection of the Austrian National Library has now in its possession two volumes, which had belonged to him, containing copies of Indian texts, partly in Devanagari, partly in Bengali script, with transcription, partly with translations and comments. These volumes illustrate the first scientific impact of Indian languages in central Europe. The Manuscript Collection comprises about 150 Indian manuscripts, some of which are very valuable. Out of these 33 Sanskrit manuscripts, partly on birch bark and partly on paper, were purchased in Srinagar, Kashmir, in 1894. Another 42 volumes were also purchased. They are mainly literary Sanskrit manuscripts on birch bark and palm leaves. The rest of the collection consists of manuscripts in a variety of languages and scripts (Pali, Oriya, Telegu, Grantha, Tamil, Singhalese), and also religious and literary works, and letters. Mostly palm leaves were used as writing material, a few manuscripts only are written on bark or paper. The latter group of manuscripts came mainly from two large collections: the collection of Freiher von Hugel, and Karl von Scherzer. In 1830-36 Hugel travelled to the Near East and India and returned with large collections, among them the manuscripts which were incorporated in the then Imperial Library. Scherzer, an eager explorer and traveller who undertook three journeys round the world, travelled in India twice. Like Hugel, he returned to his country with valuable collections, parts of which are in the Austrian National Library. All the above mentioned manuscripts date back to the 17th and 19th centuries.

The library owns also two albums containing a large number of miniature paintings by the Moghul painters of the 16th to 18th centuries.

Apart from the manuscripts, the Austrian National Library includes numerous printed books, Indian as well as Indological works. Not only the Austrian National Library possess literature concerning India, but also the library of the Oriental Institute of the University of Vienna, and the library of the Institute for General and Comparative Philology and Indo-Iranian Philology of the University Graz.

STUDIES IN CATALOGUING

S. PARTHASARATHY
Insdoc, New Delhi

Reviews some recent studies made to arrive at a set of normative principles for cataloguing as a basis for evolving an international catalogue code. Enumerates major contributions from India. Traces the historical development of catalogue codes. Examines difficulties in the choice and rendering of personal and corporate names for catalogue entries.

0 INTRODUCTION

In the development of library techniques, cataloguing has always occupied a prominent place. It was the earliest to evolve as a technique. But in its development, it is still caught up in the mesh of century old traditions. However, attempts are now being made to lift it out of its past and to give it a proper shape. Ranganathan's Heading and canons* published recently is an important contribution in this direction. It is also very timely, as attempts are being made to evolve an international catalogue code. This problem will be discussed by the Ifla at its forthcoming conference at Brussels in September 1955.

01 Indian Contribution

It will be worthwhile to enumerate some of the contributions from India. They are mostly the work of Ranganathan and his associates. His contributions in the field of cataloguing has been considerable and unique. He brought in fresh air. He built up a new code - a classified catalogue code - on a scientific basis. He demonstrated how a classified catalogue code was a more evolved code. He formulated a set of basic principles and canons of cataloguing. He analysed ruthlessly the basis of existing codes and spotlighted their shortcomings. He gave a scientific explanation for the preference of surnames as the leading element of personal-name-entries in the case of Western names. He also showed how the 'surname' concept was not universally applicable, particularly to Asian names. He has, under a Unesco project, prepared a report on the rendering of Asian names in a sociological matrix, enumerates the difficulties in arriving at a cut and dry solution, and suggests a method of approaching the problem at local, national and international levels. All these aspects have been touched upon in his Headings and canons.

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*Ranganathan (S.R.): Heading and canons --- comparative study of five catalogue codes. 1955. Demy 8°. Pp. 300. India Rs. 10; Foreign 24 sh. S. Vishwanathan, Madras, and G. Blunt & Sons, London.

1 HISTORICAL BACKGROUND

The earliest landmark was the catalogue code drafted by Panizzi of the British Museum in 1841. His 91 rules became the basis of many of the modern catalogue codes.

Cutter's Rules for a dictionary catalogue published in 1876 was another landmark. It has influenced considerably in evolving some basic principles for subject approach in cataloguing. It also sets out the purpose of a catalogue, the functions it has to perform and the approaches it has to meet. It was the first code to recognise the concept of corporate authorship.

Instruktionen fur die alphabetischen Kataloge der preussischen Bibliotheken (1899) was developed in Germany by a committee for the use of the German union catalogue. This code does not recognise the concept of corporate authorship. It recommends only title entries for publications of corporate bodies. This is a major difference between the German and Anglo-American practices. However, there is now a tendency among the German libraries to accept corporate authorship. This increases the chances for arriving at an agreed code at the international level.

The Anglo-American code for author and title entries published in 1908 was the first attempt at international co-operation in the field of cataloguing. It was also the product of committee work. It was drafted by a committee set up by the American Library Association and jointly considered by the British Library Association. Catalog rules, author and title entries was issued as a joint publication by them. Barring seven instances, there was complete agreement between the British and American practices. This was quite an achievement. Recently a revised and enlarged edition has been brought out as A. L. A. cataloging rules for author and title entries (1949). This was published independently by the American Library Association. Unfortunately, due to war conditions, it was not possible for the British Library Association to co-operate in the preparation of this edition.

The Vatican code Norme per il catalogo degli stampati (1931) was another instance of international co-operation. Due to the munificence of the Carnegie Endowment, a team of American librarians were sent for organising the catalogue of the Vatican Library. The code was compiled by them in collaboration with the Italian librarians specially trained in the United States for this purpose. It was largely influenced by the Anglo-American code and reflected particularly the American practices in cataloguing.

Ranganathan's Classified catalogue code was published in 1934. It is a unique contribution from India. It was the first complete published code for a classified catalogue. It recognised the subject-approach as the dominant approach that has to be met by a catalogue. It is developed on a functional basis. With this code as the basis, normative principles and canons of cataloguing were derived by Ranganathan in his Theory of library catalogue (1938).

2 STRUCTURE

Structurally, all these catalogue codes are dominated by early traditions. In its pre-code stages catalogue was developed by book-trade for the preparation of their book-lists. Many of the practices developed by them have unconsciously crept into catalogue codes. These practices have become so natural that they are accepted as essential without examining their appropriateness in a library catalogue. Only a re-examination of the purpose of a library catalogue on a functional basis and with the help of normative principles can lift the catalogue from the hold of tradition.

21 Rigidity

A catalogue code has a rigid frame-work. It becomes encrusted. It is not flexible. It is like a statute. It demands implicit following. Under such a stifling and regimented atmosphere progress can only be very slow. Only a a re-examination of the purpose of a library catalogue on a functional basis and with the help of normative principles can remove the rigidity.

3 COMPARATIVE STUDIES

As a first approximation to evolve an international catalogue code, comparative studies of catalogue codes were undertaken.

31 Theory of Library Catalogue

In his Theory of library catalogue, Ranganathan makes an analytical study of the cataloguing practices based on Cutter's rules, the Anglo-American code, etc. As a basis for this study he developed a set of cataloguing principles. They were derived from the working of his Classified catalogue code. They consisted of some general laws (like the Law of Parsimony), Laws of Library Science (Every reader his book, Every book its reader, Save the time of the reader, etc), and canons of cataloguing (Canon of Ascertainability, Canon of Prepotence, Canon of Relevance, Canon of Context, Canon of Permanence, Canon of Currency, Canon of Consistence, etc). The Canon of Ascertainability is an important contribution. It requires that information for the heading of all main and book index entries should be taken only from the title-page and its overflow pages. This neatly gets over many of the difficulties and inconsistencies found in other catalogue codes. Their difficulties are mainly due to making the cataloguer go outside the title-page and its overflow pages to choose his heading in many instances. In his comparative study, Ranganathan brings out many of the defects of the catalogue codes and suggests solutions for removing them.

32 Hanson's Comparative Study

In his Comparative study of cataloguing rules (1939), Hanson takes the Anglo-American Code of 1908 as the basis. He restricts his study to the rules bearing upon headings or entry words. He compares rule by rule, about 18 catalogue codes. They are fairly representative of the practices prevalent in Europe and America. Against each rule of the Anglo-American code, is shown how far the other codes agree, whether there are any divergent practices, or whether there are no provisions in some of them for similar rules. The primary object of this study was to find out an area of general agreement with a view to arrive at an international catalogue code. Hanson points out that many of the divergent practices "may be eliminated without too severe a strain on national pride and idiosyncracies, without undue expenditures, or a too violent breach of long-established traditions".

33 Lubetzky

In his Cataloging rules and principles (1953) Lubetzky critically examines A. L. A. cataloging rules for author and title entries (1949). It is a study undertaken on behalf of the Board on Cataloging Policy and Research of the A. L. A. Division of Cataloging and Classification. The purpose of his study was to "point out the weakness of our cataloging code and to indicate how our rules could be improved - that is, to clear the ground and lay the foundation for the revision of the rules, not to effect such revision". He examines the appropriateness of some of the rules, points out their structural defects which give rise to many inconsistencies and lead to complexities and recommends their reconstruction for revitalising the code. A thorough study is made of corporate authorship. A chapter is devoted to formulating basic objectives and principles for the design of a catalogue code. Lubetzky's Cataloging rules and principles is a most thought-provoking and illuminating study.

34 British Study

Cataloguing principles and practice: An inquiry (1954) published by the Library Association, London, is a collection of lectures delivered at the London School of Librarianship in March 1953. It surveys the present development of cataloguing in relation to various types of libraries. Two papers are devoted to a critical evaluation of the British Museum Rules for compiling the catalogue of printed books. H. A. Sharp's paper on current research in cataloguing reviews recent development, highlights Lubetzky's study, and refers to the "original and provocative contributions to modern cataloguing research that have been made by Dr. S. R. Ranganathan in his several books on the subject". A. J. Well's paper describes the cataloguing practice of the British national bibliography. It also demonstrates the use of

Ranganathan's 'chain procedure' for subject indexing adopted by the British National Bibliography.

35 Heading and Canons

In his Heading and canons (1955) Ranganathan makes a comparative study of the following five catalogue codes:

1. A.L.A. cataloging rules for author and title entries.
2. Classified catalogue code
3. Prussian instructions
4. Rules for a dictionary catalogue
5. Vatican rules for the catalogue of printed books.

The comparison is preceded by a chapter on terminology in order to avoid 'the creeping in of fallacy or fault or indefiniteness in the progress of thought in the rest of the book'. There is also a chapter on normative principles - general laws, Five Laws of Library Science, and canons of cataloguing. They are used as a basis for the comparative study. Many of the faults in the codes are brought out. The codes follow different practices in the choice and rendering of headings. The differences are mainly due to making cataloguers go out in search of information beyond the title-page and its overflow pages. The Classified catalogue code strictly adheres to Canon of Ascertainability and avoids many of the complications. In order to have conformity it will be helpful if an international standard is developed for the lay-out and contents of the title-page and its overflow pages. A draft standard practice for author-statement for both personal and corporate authors is given. There is also a section on lay-out for international, national, regional, local and bibliophilic catalogue codes.

Heading and canons gives a critical analysis of the present position in cataloguing and offers a basis for international co-operation.

4 HEADING

Heading is the most important part of an entry in a library catalogue. The divergent practices prescribed by catalogue codes and the complications arise in this region. The treatment of Heading occupies the major part of catalogue codes. The basis for any agreement will have to depend upon uniform practice in this region.

Heading may be occupied by any one of the following elements:

1 Personal Name
2 Corporate Name
3 Title
4 Subject

These give rise to Personal Name Entries, Corporate Name Entries, Title Entries and Subject Entries.

41 Personal Name Entry

The Personal Name Entry may consist of the name of an author or its substitute, names of two or more authors, or name of collaborator, or names of two or more collaborators.

Almost all catalogue codes agree to choose the name of a personal author as an entry element. In the case of more than one author the prescription as to the number of names to be given in the Heading varies from code to code. However, it is possible to obtain a uniform practice here. Since the information is available in the title page, Canon of Ascertainability can be satisfied by all the codes.

But when we come to treatment of pseudonyms or change of names, we enter a region of conflict. For pseudonyms, some of the codes prescribe entry under the real name even though it may not appear in the title-page. For change of names, some codes prescribe the entry under the earliest name. For this information a cataloguer is made to go outside the title page and its over flow pages. This is violating the Canon of Ascertainability. This introduces many complications, increases the number of special rules, reduces speed of cataloguing and irritates the users of a catalogue when they are made to go from one entry to another. The only solution is to enter the work under the name given in the title-page. Only this name will be used by the user for getting his book.

Again, with regard to the amount of information to be given about an author in a Heading the practices are different. Many codes prescribe the use of expanded name for the heading, even though it may not be available in the title page. Some even go to the extent of given date of birth, date of death in the case of deceased authors, and even their profession. This is done perhaps in an anxiety to avoid introducing homonyms at some future date. For this information also a cataloguer is made to go beyond the title-page and its over-flow pages.

While examining the rules for personal authors in the A. L. A. cataloging rules for author and title entries (1949) Lubetzky points out "how the multiplicity of our rules could be reduced, their complexities diminished and some of the avoidable difficulties restricted in effect. It (the analysis) reveals many parallel and duplicate rules which will scarcely help the cataloger, and unnecessary or avoidable complications which will hardly contribute to uniformity in cataloging". His remarks are equally applicable to all codes that do not follow the Canon of Ascertainability.

42 Corporate Name Entry

The concept of corporate authorship was first recognised by Cutter and enunciated in his Rules for a dictionary catalog:

"Bodies of men are to be considered as authors of works published in their names or by their authority". Ranganathan gives in his definition for corporate authorship also a criteria for deciding who is the author. According to him "a work is said to be of corporate authorship if the responsibility for its contents rests essentially on a corporate body; if the title page of a work mentions the personal name of an official of a corporate body in the place in which the author's name is usually mentioned, it is deemed to be of personal authorship if its primary function is the extension of the boundary of knowledge, and of corporate authorship if it is limited by administrative purpose, function and outlook of the corporate body".

The prescriptions in the codes for corporate author entries are very complicated. The main reason for this complication is due to the necessity for a cataloguer to reconstruct the name of a corporate body for heading. The corporate name is not given in the title page in a form that can be readily used as a heading.

Another reason for the complications is that the codes prescribe different ways of constructing headings for different types of corporate bodies. Unnecessary distinctions are made between the various types leading to contradictory results. Cutter differentiates between Societies and Institutions and prescribes different treatment for them. This gives rise to confusion. In his Theory of library catalogue (1938), Ranganathan shows that this distinction is unnecessary. Lubetzky agrees with Ranganathan and points out this distinction between societies and institutions as "irrational and impractical".

Since a corporate body is likely to have a continuous existence, the chances for change in their names are greater. Cases of amalgamation, or breaking up into smaller units, variations in the order of parts of names, etc add further to the complexity. For example, a report of the Ministry of Education of the Government of India would get as its heading

INDIA. EDUCATION (Ministry of -).

Formerly this Ministry formed part of the Ministry of Health, Lands and Education. A report on educational activities issued by this Ministry would get the heading.

INDIA. HEALTH, LANDS and EDUCATION (Ministry of -).

This makes it rather difficult to show at one place the works of a corporate body.

Another factor for confusion is the tendency of corporate bodies to have a hierarchy of dependent bodies. Some of them have descriptive names, and others distinctive names. The problem is whether the heirarchy should be maintained in the heading or some of the stages could be skipped. For example, the Department of Scientific and Industrial Research, Great Britain, has a Building Research Board and under it a Building Research Station. Here the names are descriptive and their individualisation becomes a problem.

Perhaps it is due to the complexities of corporate authorship that the German codes recommend only title entries for their works.

The concept of corporate authorship is easy to recognise but difficult to implement. We have been able to divide but not rule. Hanson's remarks on this problem quoted by Lubetzky is very apt in this connection:

" Why must we go on spending years and years of time and hundreds of thousands of dollars in deciding whether we are dealing with a society or an institution; whether an institution is to be entered under its own name, the name of the country or municipality which supports it, the place of location, or as a subhead under some larger or more comprehensive institution of which it forms a part or with which it is in some way affiliated? Why bother our heads about such a trifling matter as whether Mr. Childs did a given piece of bibliographic work on his own time and at his own expense and accordingly to be entered under his name; or on Government time and at Government expense, and therefore to be entered under the institution which pays him a salary?... Why should catalogers spend hours upon hours of their official and even unofficial time in efforts, often vain, to differentiate between Government-owned or privately owned institutions;... whether an observatory, a library, or museum is to stand on its own and be entered under its name, or, because of some Government support or affliation, under a country, city, or another institution. And then consider...the many complications and difficult decisions arising from changes in names, new affiliations, and the many changing conditions which affect the status and generally also the name of a society, an institution, or a Government department."

43 Title Entry

In the case of title heading also the practises vary. Generally for anonymous works, title is used as heading as a last resort. Even in such cases many codes would prefer to use author when known. This involves searching for the information outside the book. The Vatican code restricts the use of title heading still further. It recommends title entry for anonymous works only when their "authors remain unknown after a full and careful search".

Even in the rendering of title heading there are differences. Some codes follow the Anglo-American code in entering title "under the first word not an article". Some recommend catchword entry. In German practice 'entry is under the first governing noun in the nominative'. For the title "Was ist des deutschen Vaterland?" the entry word is 'Vaterland'. This introduces unnecessary complications.

According to German practice, title is used as heading for all works of corporate bodies. The complexities of corporate authorship are avoided, but only to make title entries more complicated.

There is general agreement for treating periodicals as anonymous works and entering them under their titles. Only in the case of change of titles, the practice differ.

44 Subject Entry

Cutter's Rules for dictionary catalogue was perhaps the earliest code to give specific rules for construction of subject entries. But it does not base the derivation of subject entries on any scheme of classification. It gives rise to many inconsistencies. As mentioned in Heading and canons, it raises number of issues for a cataloguer. He has to choose between

1 General vs Specific
2 Person vs Country
3 Event vs Country
4 Subject vs Country.

Difficulties also arise due to language, synonyms, homonyms, compound subject names, form entry etc. These are discussed in detail in Ranganathan's Theory of library catalogue. He attributes the difficulties of Cutter to the absence of a detailed scheme of library classification to individualise subject of narrow extension.

Ranganathan's Classified catalogue code gets over these difficulties in an elegant way. The subject entries are derived from the class number of a work. They are thus related to a scheme of classification. Now a cataloguer has a basis for deriving the subject entries. He has not to depend upon his flair for every entry. The method of deriving subject entries on the basis of a scheme of classification is called "Chain Procedure". It mechanises the method of deriving subject entries. Chain Procedure is described in detail in Ranganathan's Classified catalogue code. It is a unique contribution from India. It has been developed in relation to Colon Classification. It can be equally applied in relation to other schemes of classification. However, the greater the individualising capacity, expressiveness, versatility of a scheme of classification, the more efficient becomes the Chain Procedure. The British national bibliography uses Chain Procedure for deriving its subject entries based on Decimal Classification. This is demonstrated by A.J. Wells in his paper "New developments in cataloguing in the British national bibliography" published in

Cataloguing principles and practice (1954). In another paper "Our debt to India" published in Library science in India (1953), he writes:

"I have decided to introduce three techniques into the BNB ... detailed featuring, chain indexing and the imposition of the facet formula on the DC schedules. It was soon realised that the chain procedure is not helpful unless the Class Number is co-extensive with the subject of a book. DC notation fails in this respect. BNB developed its "(1)" symbol and its system of verbal extention of class number to make the latter fit for use in chain procedure". This large scale application of Chain Procedure has given good results and has evoked considerable interest in this method.

5 CONCLUSION

The recent studies have attempted to analyse the present position in cataloguing and arrive at some general agreement as a basis for international co-operation. They will prove very helpful when the International Federation of Library Associations takes up this subject for study at the forthcoming Third International Library Congress at Brussels in September 1955. India's contribution in this connection is considerable and will surely influence the decisions taken at the Congress.

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CALCUTTA UNIVERSITY
CENTRAL LIBRARY

DEPTH CLASSIFICATION

12. ORGANISATION OF NOTATION IN ZONE 3

S. R. RANGANATHAN

After settling the necessary terminology, describes the phenomenon of telescoped facet arising out of mixed notation and leading to economy in schedule length. Determines the different critical numbers in group notation. Discusses the need for cross-groupings.

1 TERMINOLOGY

The study of the organisation of notation in an array resolves itself into that of organisation in the zone of special isolates based on essential characteristics and that of the sequence of the zones themselves. In this study, the following concepts will be of some help:-

1 True Isolate
2 Quasi Isolate
3 Pure Array
4 Mixed Array
5 Pure Octave
6 Mixed Octave
7 Telescoped Array
8 Telescoped Facet
9 Group Notation
10 Critical Number
11 Cross Grouping

10 Symbolic Metalanguage

The following symbolic metalanguage will be used to secure brevity in the statements:-

(BC)	Basic class
(P)	Personality facet
(1P1)	Personality facet of level 1 in round 1
(1P2)	Personality facet of level 2 in round 1
(1P1) (1A)	Array of order 1 in (1P1)
(1P1) (1A) (nO)	Octave n in (1P1) (1A)
(1P1) (1A) (fF)	Focus F in (1P1) (1A)

Strictly speaking, we should insert between (1A) and (nO), and (1A) and (fF), the symbol (SIEZ) to denote the zone of special isolates based on essential characteristics. But our discussion will be largely confined to this zone only. Therefore, it is omitted and taken as understood, to secure further economy.

11 True Isolate

Let us consider the isolates in (1P1) (1A) of "B6 Geometry". They are as follows in CC:-

1 Line (One dimension)
2 Plane (Two dimensions)
3 Solid (Three dimensions)
4 Four dimensions
5 Five dimensions
7 n dimensions

These isolates are all based on their characteristic 'dimension'. Each of the isolates is of just one measure of dimensions. Each is an entity in the Universe of Space, being classified. None is a group of classes of space. An isolate of this kind will be called a "True Isolate". The significance of the epithet "True" will become clearer in section 12. Here is a table of

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* Continued from *An lib sc* 2, 1955, 42.

some facets with true isolates. The isolates themselves may be looked up in CC.

(BC) Number	Facet	Descriptive Name of Facet
B13	(1P1)	Number
B23	(1P1)	Equation
B33	(1P1)	Equation
B33	(1P2)	Degree
B33	(1P3)	Order
B7	(1P1)	Matter
B9	(1P1)	Body
O	(1P2)	Form
U	(1P1)	Geography
V	(1P2)	Organ
W	(1P1)	Type of State
W	(1P2)	Organ
X	(1P1)	Business
Z	(1P1)	Community
Z	(1P2)	Law

12 Quasi Isolate

Let us consider the isolates in (1P1) (1A) of "2 Library science" and of "Y Sociology". They are as follows in CC:-

2 Library Science	Y Sociology
1 Trans-local	1 By age and sex
2 Local	2 Family
3 Academical	3 By residence
4 Business	4 By occupation
5 Contact	5 By birth and status
6 Special class of clientele	6 Abnormal and defective
7 Ownership	7 By race
	8 By association

The following isolates in the matter facet of first level in first round in "2 Library science" may also be considered:-

1 By mode of production
2 By script
3 By language
4 By nature of publication
5 By agency of production
6 By period of publication
7 By edition
95 Translation

Each of the above isolates is really a characteristic which can be used to classify the universe of libraries, social groups, and books respectively. In these cases, possible relevant characteristics are enumerated in (1A). The divisions of the universe based on each of them will be enumerated only in the respective (2A). A characteristic enumerated as an isolate is not a true isolate. It will be called a "Quasi Isolate".

13 Pure Array

A "Pure Array" is an array whose isolates are all true or are all quasi. Arrays mentioned in section 11 are all pure arrays of true isolates. Arrays mentioned in section 12 are all pure arrays of quasi isolates. Thus there are two kinds of pure arrays. It must be remembered that this distinction is applicable only to the (SIEZ) of an array.

14 Mixed Array

Let us consider the isolates in (1P1) (1A) of "M(J7) Rope making" and in (1P2) of "P Linguistics". They are as follows in CC:-

M(J7) Rope making (Matter facet)		P Linguistics (Element facet)	
1	Cotton	1	Phoneme
2	Coir	2	Syllable
3	Hemp	3	Word
4	Flax	4	Phrase
5	Jute	5	Clause
6	Sissal	6	Sentence
8	Other vegetable fibres	7	Piece of composition
94	Artificial fibres	8	Punctuation
98	Metal fibres	9	Practice materials
		91	Grade 1
		92	Grade 2

In M(J7), (1F) to (6F) in (1P1) (1A) (1O) are all true isolates. But (8F) to (98F) are all quasi isolates. Each array having both true and quasi isolates will be called a "Mixed Array". In P, all the isolates in (1P2) (1A) are true isolates. But those of (2O) admit of a common label viz Practice material. This fact should not mislead us to import the idea of quasi isolate into the array. It must be remembered that 9 is not isolate number in the strict sense; it is only an octavising digit, which happens to admit of a term attached to it in the verbal plane in this particular case. (1P2) (1A) of P is, therefore only a pure array.

15 Pure Octave

A "Pure Octave" is an octave whose isolates are all true or are all quasi. All the octaves shown in section 12 and the (2O) of M(J7) shown in section 14 are pure octaves of quasi isolates. Thus, there are two kinds of pure octaves.

16 Mixed Octave

A "Mixed Octave" is an octave containing true as well as quasi isolates. (1O) of M(J7) shown in section 14 is an example of mixed octave.

17 Telescoped Array

Let us consider the following (1P1) (1A) of "Botany" and of "Zoology". These are found in schedules I and K of CC and 58 and 59 of UDC.

1P1 (1A) of Botany			1P1 (1A) of Zoology		
CC No	Isolate Term	UDC No	CC No	Isolate Term	UDC No
1	Cryptogamia	221	1	Invertebrata	2
2	Thallophyta	222	2	Protozoa	31
3	Bryophyta	232	3	Porifera	34
4	Pteridophyta	235	4	Coelentrata	33
5	Phanerogamia	24	5	Echinodermata	39
6	Gymnosperm	242	6	Vermes	51
7	Monocotyledon	252	7	Mollusca	4
8	Dicotyledon	261	8	Arthropoda	52
95	Ecological groups (2A)	1.526	9	Prochordata and vertebrata	6
951	Land plant		91	Prochordata	
952	Creeper		92	Fish	7
953	Climber	1.526.43	93	Amphibia	76
954	Other types		94	Reptile	81
955	Water plant	1.526.3	96	Bird	82
9551	Fresh water	1.526.323.2	97	Mammal	9
9555	Marine		995	Ecological groups (2A)	
9597	Insectivorous	1.533.4	9951	Land animals	
			9952	Non-carnivorous	
			9953	Carnivorous	
			9954	Other types	
			9955	Water animals	
			99551	Fresh water	
			99555	Marine	

UDC does not imply, as the UDC numbers show, any special organisation in the notational plane. Therefore, we shall discuss only CC. For the purposes of this section we shall confine ourselves to (1O) of Botany and to (1O) and (2O) of Zoology. Viewed from the idea plane, (1F) and (5F) of Botany are isolates of order 1. The remaining foci are of order 2. In fact, (2F), (3F) and (4F) are subdivisions of (1F), and (6F), (7F) and (8F) are subdivisions of (5F). But, viewed from the notational plane, they all appear to be of the same order viz order 1. In fact, arrays of two different orders are presented as if they belong to one and the same array. Similarly in Zoology, (1F) and (9F) are of order 1, as viewed from the idea plane. The others of (10) and (20) are of order 2. But viewed from the notational plane, they all appear to be of order 1. Such a telescoping of array of two different orders according to idea plane into a single array in the notational plane is due to notational exigency. When the array of the earlier order has only one, two or three isolates, in order to prevent the digits in the notational plane from running to waste, this array and the array of the next order are telescoped into a single array in the notational plane. The longer the base of the notation, the more frequent will be the telescoping. It is so in BC. Stated in another way, telescoping leads to the saving of a digit in the isolate numbers of the foci of the later order. We may define "Telescoped Array" as an array in the notational plane in which occur foci which are of two different orders of array according to the idea plane.

2 Telescoped Facet

A "Telescoped Facet" is a facet in the notational plane, in which occur foci which belong to two or more facets according to the idea plane. Such a facet occurs in CC. They arise out of the concepts of "systems" and "specials". A generic name for both is Amplified Basic class. We shall begin with some examples.

Specials			Systems		
CC No	Category	UDC No	CC No	Category	UDC No
		C Physics 53			
C9B	Microphysics	539	CK	Gravitation	531.51
C9B1	Molecule	539.13	CM	Kinetic	523.7, 533.7,
C9B2	Atom	539.15	CM6	Ether	530.112
C9B3	Nucleus	539.152.1	CM65	Electro-magnetic	538.3
C9B31	Neutron	539.185	CM9	Electron	
C9B35	Proton	537.133	CM96	Radio-activity	539.16
C9B37	Meson		CN	Relativity	530.12
C9B4	Beta ray	539.165	CN0	Quantum	530.145
C9B41	Positron	539.167.3	CN2	Wave-mechanics	530.145.6
C9B5	Electron	537.533			
C9B6	Thin film	539.213			
C9B71	Low pressure				
C9B78	High pressure				
C9C5	Supersonic barrier	533.6-114			
C9D1	Low temperature	536.48			
C9D8	High temperature	536.45			
C9F1	Low potential	537-72			
C9F8	High potential	537-77			
		J Agriculture 63			
J9D1	Soilless farming	631.584	JB	Forestry	634.9
J9D2	Dry farming	631.586			
J9F8	Intensive farming	631.583			
		L Medicine 61			
L9C	Child	61-053.2	LB	Ayurveda	
L9E	Old age	61-053.9	LC	Siddha	
L9F	Female	618	LD	Unani	
L9H	Tropical	61 (213)	LL	Homoeopathy	615.531
L9U8	Aviation	612.275.1	LM	Naturopathy	615.83
L9V	War	356.331			
L9X	Industry	613.6			

Note

1. The word "theory" should be added to each of the above terms
2. UDC does not provide for "systems" and "specials".

The idea of "System" was recognised in the idea plane and provided for in the notational plane even in edition 1 of CC(1933). It was called by several terms like "Hypothesis" and "School" in successive editions. DC and UDC have not provided for them. The idea of "Specials" took shape only in 1952 at a meeting of the Library Research Circle in Delhi. It was provided for in edition 4 of CC(1952). It is not provided for in DC or UDC. An exposition of these was given by S. Parthasarathy in Optional facets 13, System of physics and special physics published in the Annals part of Abgila, 2, 1952, 265-67; K.D. Puranik in Optional facets 14, Specials in economics published in the Annals part of Abgila, 2, 1952, 268-72; and D.B. Krishna Rao in Optional facets 18, System and special in agriculture published in the Annals part of Abgila, 3, 1953, 25-29.

21 System

An exposition of a subject can only be according to some system. In other words, there can be no document on a basic class qua basic class. The ideas in a basic class sans system are ineffable. This means that the class number of a document can hardly begin with basic class number un-amplified by a number denoting some system. The number to denote a system is got by the chronological device. The epoch used is the date of first exposition of the system. It is, of course, difficult to get the exact year. Even the exact decade may be difficult in some cases. But systems of a basic class are not invented every year or every decade even. It is often sufficient if the century digit alone is used. When two or more systems claim the same century digit, we should no doubt add the decade digit. In extreme cases, even the year digit may be necessary. This is all according to the rules pertaining to the chronological device.

211 System Number and System Facet

The chronological number denoting a system is its "System Number". Each system is an isolate. The totality of the system isolates of a basic class forms its "System" Facet. The system number is attached directly to the basic class number, without the insertion of any connecting symbol. In regard to ancient systems it is difficult to assert even the century. But many ancient systems are not known in any basic class. If historical research unearths any more, there is every chance of locating it in time in relation to the already known systems. In the meantime, we use the digits B and C as the first digits of system numbers for very ancient systems. The digit A is reserved for any document comprehending several systems. These notational conventions explain the use of the system number B for "Forestry" in Agriculture, B for Ayurveda in Medicine, C for Siddha and D for Unani. If there is a document giving an exposition of Physics according to Aristotle, we shall use C for its system number and make CC its class number. CC is Amplified Basic Class Number. Aristotelian Physics is Amplified Basic Class. Similarly CN, JB and LC are Amplified Basic Class Numbers. Their respective Amplified Basic Classes or Systems are Relativistic physics, Forestry and Ayurvedic medicine.

212 Favoured System

Now comes a suggestion from the Law of Parsimony. It draws our attention to the notational plane and to literary warrant in the idea plane. In a particular age, the majority of documents are according to one particular system. The older systems recede to the background. Fresh documents are created on them only by antiquarians. They seldom compete in number with the documents on the system favoured in the age. New systems may be borne in the age. But they too attract comparatively fewer documents on macro thought. In view of this literary warrant and out of deference to the Law of Parsimony, the System Facet is omitted in the case of the Favoured System. Incidentally, it gives precedence to the Favoured System over the other systems. This satisfies the Canon of Helpful Sequence. No doubt this may produce anamoly in relation to the Principle of Later-in-Time. To a chronologically attuned mind, it may be shocking to find Aristotelian Physics after Newtonian Physics, Forestry after Agriculture, or Ayurvedic medicine after Allopathic medicine. But, when two cats fight among themselves over a cake, the monkey makes the best of it. When the Principle of Favoured Category and the Principle of Later-in-Time fight with one another, the Law of Parsimony decides the issue in a way favourable to itself. Thus the unamplified, bare basic class is made to take the place of the favoured system of the basic class. Bare unamplified basic class number means favoured amplified basic class number.

213 Facets for Systems

Each system, i e each amplified basic class including the bare basic class standing for the favoured one, will admit of facets pertaining to each fundamental category, level and round. Rule 6503 of CC prescribes that in the case of the favoured system, (1P1) need not be preceded by its connecting symbol. It may be attached directly to the Basic Class Number. The same rule implies that (1P1) should be preceded by its connecting symbol comma if the system facet precedes it. This is necessary to avoid ambiguity in classificatory language. Ambiguity will arise on account of three factors conspiring together:-

1 System is not always of the same number of digits;
2 Its second and later digits are numerals; and
3 The first digit of the (SIEZ) of (1P1) is a numeral. Therefore, it is not possible to know where the system facet ends and where (1 P1) begins unless the connecting symbol is inserted between them.

214 Schedule for Facet

In some cases as in Psychology and Education, the same schedules for the respective facets may be suitable to all systems. Certain systems of a basic class may need special schedules for themselves. For example, the substance schedule (1P1) and the problem schedule (1E) currently used for the current favoured system of Chemistry may not be suitable for the ancient system of chemistry called Alchemy. Some systems may require a few extra isolates peculiar to themselves in some facets. For example, the Problem schedule (1E) and particularly its (3F) physiology and its (4F) disease may require additional isolates in Ayurveda. (3F) of handling facet (2E) for (1E) (4F) disease will need sub-divisions relating to Diagnosis by Pulse Beats known as Dhatu in Sanskrit. No system of classification has yet built the schedules necessary for the diverse systems of each basic class. They have all given schedules only for the favoured system. The pressure of literary warrant is not high enough, at present, to make us build appropriate schedules for the older, out-moded systems. The interest in research into the history of sciences which is now developing may produce the necessary pressure in due course. In the case of the newly emerging systems, we have more documents on diversified micro thought with several facets, but few on macro thought with facets. This accounts for absence of effort in producing the necessary schedules. Another unfavourable factor is that the new system may still be in the formative state and it may be too premature to determine the mode of development and proliferation. But intensification of research is producing an enormous number of documents. Documentation urge also is increasing.

215 Why Amateurish?

But unfortunately there is a tendency to evade the problems or deal with them in an amateurish way. The workers in the various basic classes are often entrusted with the task of modifying existing schedules or producing new schedules to suit new systems. These specialist workers have had no grinding in the discipline of classification still less in designing a system of classification. They know their categories, no doubt; but they do not know the canons of classification or of applying them. The result is that they produce only temporary make-shifts. The majority of the library profession is working in public libraries; they are not interested in depth classification, because they do not handle micro thought for service. There is even resistance to depth classification. Resistance is, unfortunately, found even among those whose chief work is to supply documentation lists. Vast sums of money are now spent everywhere on documentation. But it often turns out to be a play without the Hamlet.

216 The Cure

The cure for this wastage can emerge only by a proper organisation of the training of documentalists. Here again there is a grievous tendency. The profession of documentalist is often mistaken to be the profession of the technician producing copies of documents either on a big scale or on a micro scale. Production of micro-cards and microfilms needs no knowledge of the thought-content of the documents copied. It needs only knowledge of the copying processes, be they photographical or chemical. The micro copies call also for work on the part of opticians to produce suitable reading apparatus. Surely, these technicians can not be deemed to belong to the profession of documentalists. I believe that dressing the thought-content of documents so as to serve each research worker exhaustively, and expeditiously with the documents exactly dealing with the theme of their pursuit, locating them and bringing them to their notice is the essential function of documentalist. If this is conceded, the principles of depth classification, the application of analytico-synthetic classification both to classify documents and to find out the exact requirements of a reader, and the minutely classified and helpful featuring in documentation lists will be seen to be essential subjects in the course of training of documentalists.

217 Task of FID

FID is the international body that should set standards both in the building of schedules for various facets and in the training of documentalists. For several years in the past, it had allowed its working parties for the different schedules to be made of specialists in the subjects without associating with them specialists in the discipline of classification. About 1951, it produced a set of guiding principles to help the working parties. These are too meagre and too superficial. They are more procedural than substantial. Of late, a committee has been set up to consider the education of documentalists. But its energy appears to be frittered away in establishing independence from the training of librarians and seeking alliance with the training of technicians for the production of microfilms and reading apparatus. There seems to be hardly any evidence of its having seized the essence of a documentalist's function of realising that it is concerned with the thought-content of micro documents needing depth classification for proper exploitation. FID should therefore, re-examine and re-construct its Working Parties, with a specialist in the discipline of depth classification associated with each one of them, re-compose its guiding principles for the modification of old schedules and construction of new schedules, and pursue the subject of the training of documentalists along realistic and relevant lines.

22 Specials

While systems are differentiated from one another by hypotheses and theories, specials are differentiated from one another by restriction in the universe of the basic class concerned. For example, the schedules in section 2 show the following:-

1. In nuclear physics, all the dimensions — space, time and mass — are restricted to micro or infinitesimal limits. In other specials in physics, there is restriction in the range of pressure, temperature, potential and so on. The ranges are all abnormal. The behaviour of matter and the technique of study within such abnormal, restricted ranges are different from those within normal ranges. There is much work in progress to-day in such specials. New specials too get created from time to time.
2. In agriculture too, the present-day unbalancing of the relation between population pressure and the production of food and other necessary plant products has led to the study and improvisation of farming methods suited to restricted ranges of soil quality, water supply, temperature, and other factors — all such restricted ranges being abnormal. New specials are being created; and there is much work in progress in several specials.
3. In medicine, the specials of female medicine and child medicine have been in existence for long. These are concerned with the problems peculiar to the age and sex restriction concerned. In recent years, the other abnormal age-range of old age also is engaging attention as a special. Large scale - machino-facture, aviation, and new developments in military, naval and aerial **warfare** have necessitated study

of medicine within other restricted abnormal ranges. These are giving rise to specials.
4. So it is in various other basic classes.
5. The universe of currently produced documents on micro thought has an appreciably high proportion of documents on specials. It is unhelpful to mix them up with those embodying the pursuit of the basic class within normal ranges of the factors inherent in the basic class.

221 Idea Plane

The universe of books embodying macro thought has even now very few books on specials, except in medicine. Thirty years ago, when CC was designed there were few books on such specials coming into our library. Fifty years ago, when UDC was raised on DC, experience with specials would have been even less. Therefore, the schemes did not sense the existence of specials and the need for paying special attention to them. With the penetration of documentation into the universe of micor thought, specials are beginning to thrust themselves into the field of attention of classificationist, classifiers and reference librarians. There was first difficulty in the idea plane itself. What exactly should be done with documents dealing with a basic class within specified abnormal ranges was not clear. Mixing them up with documents pertaining to normal ranges was increasingly felt to be unhappy. At a meeting of the Library Circle of Delhi about the end of 1951, it was finally decided that the category 'specials' should be recognised in classification, in the same way as the category "systems", that the literature on each special should all be brought together, and that the specials should come after the "normals". This was felt to be necessary in order to satisfy the Canon of Helpful Sequence. The Canons for Filiatory Sequence, formulated in the forthcoming edition 2 of the Prolegomena to library of classification of Ranganathan, require that the documents on a "special" — i e embodying the results of study of a basic class within an abnormal, restricted range of a particular factor or complex of factors — should not be mixed up with the documents, either of some other "special" or of "normal" according to any "system", favoured or non-favoured. This means that each "special" creates a parallel sequence within a basic class. Of course, each "system" also does so. All these findings are in the idea plane. They hold good whatever be the scheme of classification used. In fact, every scheme of classification should accept them and implement them.

222 Notational Plane

In CC, the design in the notational plane was guided by the analogy of the design for "systems". It was easily seen that the "specials" should be individualised by the device of "Amplification". Amplification really amounts to accommodation in (SIEZ) i e the zone of special isolates based on artificial characteristics. The last octave of this zone has been already occupied by the "systems". Therefore, the "specials" were accommodated in the penultimate octave of the zone. The next problem was the choice of a device for getting the first significant digit in the number to be a Roman capital. It can be got either by alphabetical device or by chronological device. The specials do not have an internationally accepted crisp name. Therefore, alphabetical device had to be given up. Nor is it easy to determine the year of the beginning of such a special. Moreover, it is only in recent years that research by large teams has been intensified on a world scale. Therefore and for the economic reasons mentioned in section 22 a crop of specials come up more or less at the same time. For these reasons, chronological device also had to be abandoned. Finally, we had to land on the device of enumeration with Roman capitals as base.

223 Guiding Principles

It has been tentatively proposed to have the following principles for guidance in the allocation of the 24 Roman capitals:-
1. Follow some mnemonics, literal or scheduled; or/and
2. Divide the 24 letters among the canonical classes of the main class, or/and the five fundamental categories in respect of which the abnormal range of study of the "special" is formed; or/and
3. Divide the set of letters allocated to a canonical class or fundamental category, in the

light of literary warrant, actual or potential, among the foci pertaining to them.
In any basic class, which of the above categories may be safely ignored in which sequence the recognised categories should appear in the zone of "specials", in which proportion the 24 letters should be allocated among the recognised categories - these issues have to be decided ad hoc for each basic class. This is a matter of flair at present. Further experience should be gained before more detailed principles of guidance can be enunciated and greater autonomy can be given to the classifier in spite of enumeration being involved. The addition of further digits also needs investigation. Seminal mnemonics may be of use in this matter. A critical examination of the numbers given to "specials" in the sample schedules given in section 2, in the light of the above-mentioned principles is worth doing.

224 Schedules for Specials

All the observations made in section 214 regarding the schedules for the facets of the different "systems" are applicable to the schedules for the facets of the different "specials". The remarks in sections 215 and 216 and the appeal to FID made in section 217 aply to "specials" also.

225 Connecting Symbol

1. (1P1) should be preceded by comma, if it follows "specials"
2. "Specials", should have a comma before it, if it follows "system"
3. Otherwise no comma.

23 Examples of Class Numbers

Four types of class numbers are possible:-
1. Bare basic class number with or without facets attached;
2. Basic class number amplified for "special", with or without facets attached;
3. Basic class number amplified for "system", with or without facets attached; and
4. Basic class number amplified for "system" first and also for "special" thereafter, with or without facets attached.

Here are a few examples of them:-

Favoured System

L	Medicine
L:3	Physiology
L:4	Disease
L:4:3	Diagnosis
L214	Dentistry
L214:54	Prevention of disease
L82	Orthopaedics
L82:478	Fracture
L82:478:7	Surgery
L9A	Specials
L9C	Child
L9C:214	Dentistry
L9F	Female
L9F:4	Gynaecology
L9F,553	Uterus
L9F,553:4713	Wrong position
L9F,553:4713:7	Surgery
L9V	War
L9V,82	Orthopaedics
L9V,82:478:7	Surgery
LA	Systems
LB	Ayurveda
LB:4:3	Diagnosis
LB,214	Dentistry
LB,214:54	Prevention of disease
LB,82:478:7	Orthopaedic surgery
LL	Homoeopathy
LL,44:253:6	cure for asthma
LM	Naturopathy
LM,44:253:6	cure for asthma

System and Special Combined

LB,9C,214:54	Prevention of dental disease in children according to Ayurveda
LB,9V,82:478:7	War-field orthopaedic surgery according to Ayurveda
LM,9F,553:4713:6	Correction of wrong position of uterus according to naturopathy

24 Remarks on the Examples

1. In reading the isolate terms in the above schedule, the Canon of Context should be applied. For example, the name of the sixth class should be read as "Prevention of dental disease". The name of the ninth class should be read as "Orthopaedic surgery". The name of the seventeenth class should be read as "Surgical correction of wrong position of uterus". The name of the twenty-second class should be read as "War-

field orthopaedic surgery". The name of the twenty-fifth class should be read as "Diagnosis according to Ayurveda".

2. The schedule of 33 classes brings out the helpful sequence secured.

3. The 33 class numbers show the various ways in which Basic Class Number, System Number, Specials Number and Isolate Numbers in Facets may be combined to form expressive and co-extensive class numbers satisfying the Canons for Filiatory Sequence.

25 Levels of Personality

The connecting symbol prescribed for "system" and "special" is comma. This presumes that each of these is a manifestation of (P). We may therefore speak of system facet and specials facet, and of system isolate and specials isolate. They occur in the first round. What is the level of each? The answer to this question is implied in the last three class numbers given in section 23. The "organ" should be treated as (1P1) consistently with its level in the favoured systems. Having fixed this, we get that "specials" form (1P0) and that "systems" form (1P(-1)). In natural language, "specials" belong to personality facet of level "zero" in round one. "Systems" belongs to personality facet of level "minus one" in round one.

26 Telescoping Result

To bring out the telescoping result in the notational plane, as a consequence of the recognition of Systems and Specials in the idea plane and the method of implementing the idea in the notational plane, we shall consider the following sequence of classes:-

L Medicine
L1 Regional systems
L2 Digestive system
L3 Circulatory system
L4 Respiratory system
L5 Genito-urinary system
L6 Glandular system
L7 Nervous system
L8 Co-axial systems
L9A Specials
L9C Child
L9F Female
L9H Tropical
L9V War
L9X Industry
LA Systems
LB Ayurveda
LC Siddha

Let us overlook the first digit L, common to all the class numbers and denoting "Medicine" as the basic class. As viewed from the notational plane, what remains constitutes the Array of Order 1. But as viewed from the idea plane, it is not so. They do not all belong to one array. It is even worse. They do not even belong to the same facet. We say in the preceding section that they belong to three different facets viz (1P1), (1P0), and (1P(-1)). These three different facets stand telescoped into a single array in the notational plane. However, they stand seperated in the class number of a subject presenting either two or all the three of the facets. This is illustrated by the last three class numbers given in section 23. Such a telescoping of facets is made possible by the zones and octaves created by a mixed notation.

27 Law of Parsimony

The notational organisation admitting of facets satisfies the Law of Parsimony. It does so with due regard to literary warrant. In the universe of books embodying macro thought, books on allopathy in medicine and in the favoured system in any basic class will form the bulk, unless a library is a specialised one. There may be a few books on systems and even fewer on specials. They will all get short class numbers of 2 or 3 digits. The books on systems and specials may not present facets. As we enter the universe of articles embodying micro thought, combinations of facets, specials and systems calling for the separation of the systems facets, specials facets and the other facets and their isolate numbers being written one after another in the same class number, will become long. Moreover, the provision for systems and specials implied only the addition of a dozen or two more isolates in the telescoped first facet. But, the number of depth classes, that can be given expressive, co-extensive class numbers gets increased hundreds of times.

3 Group Notation
and Critical Numbers

Octave notation uses one and only one significant digit in the isolate numbers of an array.

But the number of digits in an isolate number increases by one for every 8 isolates. If the number of isolates exceeds 24, some of the isolate numbers will need 4 digits, some 5 digits, and so on. Therefore it becomes uneconomical to organise the notation of the (SIEZ) of an array on the basis of one and only one significant digit. Shorter isolate numbers can be had on the basis of 2, 3, etc significant digits, when the number of isolates is large. "Group notation" uses 2 or more significant digits to represent co-ordinate isolates belonging to one and the same array is determined in the idea plane. It is beyond the jurisdiction of the Law of Parsimony. But, its sway must be recognised in the notational plane. We shall now work out the limits for the number of isolates in one array, for which notation with a single significant digit, or group notation with 2, 3, etc significant digits will satisfy the Law of Parsimony.

31 One Significant Digit

Let us allow ourselves one and only one significant digit in each isolate number. Then three octaves are needed to accommodate 24 isolates. The average number of digits for an isolate number will then be 2. If the number of isolates is less than 24, the average will be less than 2. If the number of isolates is more than 24, the average will be more than 2.

Let us next allow ourselves two and two significant digits in each isolate number. But let us not excercise the freedom to use the octavising digit. The isolate numbers will then be 11, 12, . . . 87, 88 respectively. This one octave-block of 2-digited numbers will accommodate 64 isolates which are all of first order array in the idea plane. It must be remembered that none of the isolates will have a single digited isolate number. Therefore, the presence of 1, 2 . . . 8 as an array of order 1 in the notational plane is only an illusion. We may call it a Pseudo Array in the notational plane. The average number of digits per isolate number is 2. It will be 2, even if the number of isolates is only one. Thus it is seen that:-

1. Octave notation with 1 and only 1 significant digit is economical, if the number of isolates in the array is not greater than 24; and
2. Group notation with 2 and only 2 significant digits becomes economical only if the number of isolates is greater than 24.

311 Critical Number

Thus 24 is a critical number. A general mathematical equation for critical number has been derived in the *Optional facets (11)* of Ranganathan, published in the *Annals* part of the *Abgila*, 2, 1952, 249. It is as follows:

$$2\left[\log_n m\right] = m - 1$$

where m is the number of isolates in the zone and n is the number of significant digits used as base.

32 Two Significant Digits

Let us allow ourselves 2 and only 2 significant digits in each isolate number. Let us also exercise the freedom to use the octavising digit. We can have 64 isolate numbers of 2 digits i e without the insertion of the octavising digit. We can insert 1 octavising digit at the at the beginning of each of the 64 numbers; this will give us 64 isolate numbers of 3 digits. We can also insert 1 octavising digit after the first digit of each of the 64 numbers of two digits; this will give us 64 more isolate numbers of 3 digits. Thus, we can have 128 isolate numbers of 3 digits, on the whole. Let us also agree to put in any 64 isolate numbers with 4 digits; these can be got by putting 2 octavising digits in each of the 64 numbers of 2 significant digits only. Then the isolate numbers accommodated will be 256. The average number of digits per isolate number will be 3. If the number of isolates is less than 256, the average will be less than 3. If the number is greater than 256, the average will be greater than 3.

Let us next allow ourselves 3 and only 3 significant digits in each isolate number. But let us not exercise the freedom to use the octavising digit. Then one octave-block of 3-digited numbers will accommodate 8^3 i e 512 isolate numbers. The average number of digits per isolate number will be 3. It will be 3 even if the number of isolates is one only. Thus it is seen that:-

1. Group notation with 2 and only 2 significant digits is economical, if the number of siolates in the array is not greater than 256; and

2. Group notation with 3 and only 3 significant digits becomes economical only if the number of isolates is greater than 256.

321 Critical Number

Thus, 256 is the critical number of isolates in the choice between the group notation of 2 significant digits and that of 3 significant digits.

33 *n* Significant Digits

To generalise, let us allow ourselves *n* and only *n* significant digits in each isolate number. Let us also exercise the freedom to use the octavising digit. We can have 8^n isolate numbers of *n* digits, *i e* without the insertion of the octavising digit. We can insert one 9 in each of these *n*-digited numbers in *n* different ways. *i e* as the first digit, or as the second digit... or as the nth digit. Thus, we can get $n8^n$ isolate numbers of (n+1) digits. Let us also put two 9's in each of the 8^n isolate numbers with *n* significant digits. This will give us 8^n isolate numbers with (n+2) digits. Thus the total number of isolate numbers becomes $(n+2)8^n$. The average number of digits per isolate number becomes (n+1). If the number of isolates is less than $(n+2)8^n$, the average will be less than (n+1). If the number is greater than $(n+2)8^n$, the average will be greater than (n+1).

On the other hand, let us allow ourselves (n+1) and only (n+1) significant digits in each isolate number. But let us not exercise the freedom to use the octavising digit. Then one octave-block of (n+1)-digited numbers will accommodate 8^{n+1} isolates. It will be (n+1), even if the number of isolates is one only.

331 Critical Number

Thus $(n+2)8^n$ is the critical number of isolates in the choice between the group notation of *n* significant digits and that of (n+1) significant digits.

34 Table of Critical Numbers

The following table will be of use for ready reference in the choice between octave notation with one and only one significant digit, and group notation with 2, 3, etc significant digits for use in the (SIEZ) of an array.

When the number of isolates in the zone is			Economic Number of Significant Digits for Group Notation
Greater than	but	Not Greater Than	
		24	1
24		256	2
256		2,560	3
2,560		24,576	4
24,576		229,376	5
$(n+1)8^{(n-1)}$		$(n+2)8^n$	n

Will there be need to provide for such large numbers of isolates in an array? Yes. In "Depth classification 9, Agriculture 5, Species and cultivar", published in "Annals of library science", 2, 1955, 17, D B Krishna Rao mentions the existence of 2,928 species of plants with ornamental flowers, which figure as isolates in array of order 3 in agricultural.

35 Degenerate Case

The formula for critical number gives 2 as the critical number of isolates in the choice between 1 significant digit and no significant digit at all. This is got by putting $n = 1$ in the formula in the first column in the table of section 34. This implies that no significant digit need be used, if the number of isolates is 2 or 1. This singularity of implication needs explanation.

351 One Isolate

When there is only one isolate, our first impulse will be to represent it by a digit, say 1. This contradicts the direction of the critical number. A little reflection will show that the direction of the critical number is right. For, if a universe contains one and only one entity, it admits of no division. Its unique entity needs no number to denote it. Indeed we have not bother of classification. We need not look for a characteristic as the basis for classification. We need not at all worry ourselves about its attributes. It may have an infinity of attributes; or, it may be attributeless. It makes no difference. This concurs with the saying of the Vedic mystics that Brahman, the Absolute, is at once of infinite attributes and no attribute. It also gets into line with the recognition of two kinds of monism in Indian philosophy viz Advaita or monism proper postulating attributeless Absolute or Nirguna-Brahman and Visishta-Advaita or modified monism postulating attributeful Absolute or Saguna-Brahman. In the notational plane, there is no need to provide an isolate number in the schedule for a facet with one and only one isolate.

352 Two Isolates

If there are two isolates, one possible way of respecting the critical number 2, is to denote one of the isolates by 9 and the other by 99. This avoids the use of significant digit. But the average number of digits becomes 1 1/2. If we use the significant digits 1 and 2, say, to represent the two isolates, the average will be only one. The latter is therefore to be preferred on the grounds of economy. But this preference is not at variance with the import of the concept of critical number. For through the non-degenerate cases considered in sections 31 to 34, we have seen that, if the number of isolates is equal to the critical number, there are two equally economical choices possible. For example, if it is 24, the average number of digits per isolate number is 2 whether we use 1 significant digit or 2. If the number of isolates is the critical number 256, the average number of digits is 3 whether we use 2 significant digits or 3. In the degenerate case when n = 1, one of these alternatives viz no significant digit fails and there is only one way viz to use 1 significant digit.

36 Stages of Grouping

We have assumed that there is one and only one array in the idea plane. But when the number of isolates is great enough to call for group notation, the notational plane presents 2 or more arrays. Each array marks one stage of grouping. The basis of grouping at any stage may be at one extreme pure arbitrariness and at the other extreme some relevant characteristic. Take for example, the [1P4] in "O Literature" when the focus in [1P3] is Shakespeare. He is believed to have written about 37 dramas. 2-digited group notation is indicated. One way for the first stage of grouping is to arrange the 37 plays in any arbitrary sequence, put the first 8 in group 1, the second 8 in group 2, the third 8 in group 3 and the residue in group 4. A second way is to make the initial arrangement alphabetically by the title. A third method will be to make the initial arrangement alphabetically by the title. A third method will be to make the initial arrangement chronologically by the year of first publication of each play. Here, the first stage of grouping approximates to be based on chronological characteristic. A fourth method will be to make the first stage of grouping by canonical characteristic which yields the isolates Comedy, Tragedy, Romantic play, Historical play. Here comedy etc is itself a characteristic i. e. a quasi isolate. If we adopt the fourth method at the first stage of grouping, the first order array is not a pure illusion even in the notational plane. For, it has a significant correlate in the idea plane. Perhaps, we may call the resulting first order array, an Array of Significant Groups.

37 Indistinguishability

If every stage of grouping gives an array of significant groups, a facet of isolate numbers with a number of digits in the isolate, numbers can not be distinguished whether it is a result of group notation or the result of the applications of successive characteristics in a train. This indistinguishability does not affect the work of the classifier. The difference is only in the idea plane in so far as the designing work of the classificationist is concerned.

38 Margin of Tolerance

When the various stages of grouping the isolates for group notation admit of being based on helpful characteristics, it may be worth while to make some deviation from the indication of critical number. There may be need, in some cases, to use slightly more significant digits.

4 CROSS GROUPING

Let us again consider the plays of Shakespeare. Literary warrant would make the canonical characteristic mentioned in section 36 the favoured characteristic. But there is also some slight literary warrant for the use of chronological characteristic the favoured characteristic. We do have documents on "Early plays", and "Later plays" respectively. Such isolates form a Cross-Grouping of the isolates got in the second order got by using the canonical characteristic as the favoured characteristic. We accommodate such cross-groupings in the second octave of the first order array, or, if it is needed for the isolates based on the first favoured characteristic itself, in the third octave. To prevent the incidence of Cross classification, we arrest the chain based on the second and later favoured characteristics just before it would land us on an individual play. This method of organisation is wanted in many basic classes. The second octave in 1P1 of Botany and the third octave in 1P1 of Zoology, given in section 17 are derived just by this method.

5 COMMODITIES

We use the term "commodity" to denote any substance that is consumable in the general sense of "capable of being used directly, as it is, to satisfy a want". In this sense, boiled rice, box, lock, house and motor car are commodities. As against this, the paddy, from which boiled rice is got at the ultimate stage of a chain of operations is "Raw material". The rice got by husking the paddy is "Intermediate commodity". Iron ore is raw material; lock is an ultimate commodity got from it; pig iron, steel, sheet steel, bar steel, and drawn wire are intermediate commodities of different removes. Viewed from the angle of fruit salad or jam, fruit is an intermediate commodity. It is also an ultimate commodity as it can be consumed directly. It is again a raw material as it occurs in nature. Raw materials figure mostly in the basic classes Mining, Agriculture and Animal Husbandry. We have a more or less satisfactory way of arranging these isolates.

51 Commodity Isolates

Commodity isolates figure in Engineering, Technology, Useful Arts and Industrial Economics. They are many thousands in number. In the two latter basic classes CC and UDC use subject device. This gives very long number and also other difficulties. But it groups the isolates more or less helpfully. BC and LC use alphabetical device leading to unhelpful scattering.

52 Suggestion

A more satisfactory organisation of notation is necessary. Here is a suggestion. Use the zone of Arabic numerals of (1A) to accommodate certain commodities by favoured category device as determined by literary warrant. Use the Zone of Roman capitals to accommodate isolates in the first stage of grouping based on utility. Proceed similarly with the (2A) of the notational plane. About 6,000 commodities can be accommodated in this way, with the number of digits in their isolate numbers varying from 1 to 3 as decided by literary warrant. This needs pursuit.

DEPTH CLASSIFICATION

13. DEMONSTRATION 4

S. R. RANGANATHAN

Demonstrates the application of an expressive, analytico-synthetic scheme of classification to depth classification needed in documentation work. An example worked out in Bibliographic classification is taken as the guinea-pig. CC number for "Development of radar in French Navy" is constructed and compared with BC and UDC numbers. Facet analysis, exercise of autonomy of classifier in the formation of schedules needed in deeper levels, application of Packet Notation for Subject Device are demonstrated. Shows how the BC number violates one of the fundamental qualities of a class number, namely that it should not be homonymous.

0 DOCUMENT

In a footnote on page 8 of its volume 3 (1953), BC states, "To examplify the economy of our composite notation, these very special subjects follow here; and for comparison we add to these the supposed equivalent number-built notation of the expanded Decimal Classification. And how would the Colon Classification deal with these subjects and how long would its notations be?' Then follow the three subjects, each with its BC and UDC numbers. The first of these subjects is "Development of radar in French Navy." The BC Number given is BOW - RNf3. The UDC Number given is 621.396.9:359(44). We shall construct its CC Number.

1 ANALYSIS

Starting point :- One phase.

Symbolic Language	Nutral Language	Focus	CC No
(MC)	Main class	Engineering	D
[1P1]	First round first level personality	Electronics	65
[1P2]	First round second level personality	Radar in French Navy	44(945.53)

2 SYNTHESIS

Colon Class Number is D65,44(945.53)

3 NOTES

31 In ed 1 to 3, CC did not provide the isolate 'Electronics'. But it provided for it the isolate number 65 in ed 4. The first digit denotes Mechanical Engineering. The digit following it is generally parallel to the canonical divisions of C (Physics) representing forms of energy. 66, for example, has been used for Electrical Engineering, and 64 for Heat Engineering. 65 had been left blank as we could not then think of Radiation Engineering. In electronics, the form of energy

used can not be taken as Electricity. It is electrons that are used. This speed can be of the order of that of radiation. 65 was therefore used for Electronics in ed 4 (1952).

32 There is no ready-made number for radar. It is taken to be the mechanism for finding location of physical objects with the aid of Electronics. This gives it the number 44 in [1P2] . Naval radar is the whole Radar. Therefore it can be represented only by the addition of an array. The foci in this array can be taken to be special isolates and got by the favoured category device, when we have enough literature on the subject to make an estimate of literary warrant. But radar is too recent for this. Therefore, we make it a common isolate to be got by Subject Device. Such a provisional accommodation of new isolates is generally adopted.

321 In ed 4 of CC, Naval science is represented by MV5. This occurs in the main class Useful Arts. To put Warfare in Useful Arts has been always irritating. But the concept of Prels developed in Ranganathan's Depth classification (1953) and the recent discovery of zone 2 in the array of main classes to accommodate the Prels has released zone 3 in the array of main classes to accommodate many main classes other than those in the last octave of that array. Some of the main classes accommodated in zone 3 in ed 4 of CC are, therefore, being transferred to zone 2. The only ones retained are 1 Knowledge universe, 2 Library science, and 3 Book science. It is proposed to accommodate War science in the second octave of the array of main classes, in ed 5 of CC. Then, Naval science will be represented by 945.

322 In the forthcoming ed 2 of the Prolegomena to library classification, the need for enclosing any number got by subject device within circular brackets has been finalised. The need for some such device has been felt for several years. It was confirmed when I met the Classification Research Circle of London in June 1954. The proposal is put up in Ranganathan's Report 5 to FID, to be discussed at the Brussells Meeting in September 1955. This is called Packet Notation. Accordingly, the isolate number for Radar in French Navy becomes 44(945.53).

4 LENGTH OF CLASS NUMBER

The following table gives the length of the class number for the subject under consideration in BC, CC, and UDC:-

BC	CC	UDC
8	14	17

41 Notes

1 When sufficient literature comes up on Radar, it may be possible to replace the 8 digits (945.53) by a shorter number or perhaps 3 digits. Then the length of CC number will be only 9.

2 UDC number is unduly long because it is obliged to use the Colon Device. This can be avoided if UDC rationalises its notation and escapes from the grip of the rigid DC core.

3 However there is no denying that the BC Number is very short — nearly half as short as the other class numbers.

4 But before we uphold its shortness, we should examine at what cost BC has secured shortness. It will be shown presently, that the BC number violates one of the fundamental qualities of a class number viz it should not be homonymous. The connecting symbol hyphen is a do-all symbol. It thus introduces homonyms. In fact the BC Number BOW-RNf3 can be taken to represent any one of seven different subjects.

5 A similar fault of homonym is incident in the UDC Number also. This again is due to its connecting symbol being a do-all symbol, incapable of distingushing the various possible kinds of relations between the classes forming the two members of the colon combination.

5 SIX OTHER SUBJECTS

The following are the six other subjects represented by the BC and the CC Numbers given in section 0. Let us construct the CC Number for each of them.

51 Subject 1

510 Document

"Exposition, in France, of radar for students of naval science."

511 Analysis

Starting point :- Two phases, Bias relation.

Symbolic Language	Natural Language	Focus	CC No
	Phase 1 :- Radar		
(1MC)	Main class of phase 1	Engineering	D
[1P1]	First round first level personality	Electronics	65
[1P2]	First round second level personality	Radar	44
	Phase 2 :- Naval science		
(2MC)	Main class of phase 2	War Science	94
[1P1]	First round first level personality	Navy	5
[S]	Space facet	France	53

512 Synthesis

Class Number is D65,440b(945).53

513 Notes

1 The connecting symbol for phase is 0. The isolate number for Bias Relation is b.

2 The number of the second phase of a phased class number is always got by Subject Device. Therefore, the number of the second phase is always got by Packet Notation.

3 The context within the subject makes it obvious that the Space Facet belongs to the complex phased class and not to any one of the classes forming either phases. Therefore, the Space Facet has to be attached at the very end of the complex phased class number.

514 Length of Class Number

The class number contains 16 digits. But it is truly expressive of and coextensive with the thought-content of the document.

52 Subject 2

520 Document

"Exposition of radar for the staff of the French Navy".

521 Analysis

Starting point :- Two phases. Bias relation.

Symbolic Language	Natural Language	Focus	CC No
	Phase 1 : Radar		
	(Same as in section 511)		D65,44
	Phase 2 : French Navy		
(2MC)	Main class of phase 2	War Science	94
[1P1]	First round first level personality	Navy	5
[S]	Space facet	France	53

522 Synthesis

Class Number is D65,440b(945.53)

523 Notes

1 The context within the subject makes it obvious that the Space Facet belongs to the Second Phase. This is different from what happened in the document given in section 510. The class number of the Second Phase is, therefore, 945.

53. Therefore the whole of this number has to be put within brackets.

2 There is no difference in the isolate number for phase relation, as it is Bias in this document also.

524 Length

The class number has the same 16 digits as the document of section 510. But the inclusion of 53 within the brackets makes the number truly expressive of the document under consideration.

53 Subject 3

530 Document

"Influence of naval science on radar, in France."

531 Analysis

Starting point :- Two phases. Influencing relation.

Symbolic Language	Natural Language	Focus	CC No
	Phase 1 : Radar (Same as in section 511)		D65,44
	Phase 2 : Naval science (Same as in section 511)		945
[S]	(Same as in section 511)		53

532 Synthesis

Class Number is D65,440g(945).53

533 Notes

1 The isolate number for Influencing Relation is g.

2 The other notes are similar to those in section 513.

534 Length

The class number has 16 digits as in the other two subjects. But the introduction of the facet of phase relation and the use of different isolate numbers for different kinds of phase relations, has avoided the fault of homonym found in BC and UDC numbers.

54 Subject 4

540 Document

"Influence of French Navy on radar."

541 Analysis

Starting point :- Two phases. Influencing relation.

Symbolic Language	Natural Language	Focus	CC No
	Phase 1: Radar (Same as in section 511)		D65,44
	Phase 2: French Navy (Same as in section 521)		945.53

542 Synthesis

Class number is D65,440g(945.53)

543 Notes

1 Same as in section 533.

2 Same as in section 533.

544 Length

The class number has 16 digits. They are the same as in section 534. But, the inclusion of the number .53 within the brackets makes the resulting number different. And it avoids incidence of homonym.

55 Subject 5

550 Document

"Influence of radar on French Navy."

551 Analysis

Starting point : Two phase. Influence relation.

Symbolic Language	Natural Language	Focus	CC No
	Phase 1: French Navy (Same as for phase 2 in section 541)		945.53
	Phase 2: Radar (Same as for phase 1 in section 511)		D65,44

552 Synthesis

The class number is 945.530g(D65,44)

553 Notes

Obviously, the main subject of exposition in this document is French Navy. Radar comes in only as a factor influencing the French Navy. This is not a document on Radar. But in the document in section 540, the main subject of exposition is Radar. French Navy comes in only as a factor influencing the development of Radar. It is not a document on French Navy *qua* French Navy. This semasiological difference in the idea plane, as indicated by the verbal plane, is implemented in the notational plane by changing the sequences of the two subjects in the arrangement of the phases.

554 Length

The class number has the same 16 digits as that in section 544. But their rearrangement makes each of the class numbers truly expressive of the thought contents of the respective documents.

56 Subject 6

560 Document

"Development, in France, of the naval use of radar."

561 Analysis

Starting point :- One phase.

Symbolic Language	Natural Language	Focus	CC No
(MC)	Main class	Engineering	D
[1P1]	First round first level personality	Electronics	65
[1P2]	First round second level personality	Radar in Navy	44(945)
[S]	Space	France	53

562 Synthesis

The class number is D65,44(945).53

563 Notes

This document differs from the document mentioned in section 0, in that France is a separate facet in this document, whereas it forms a factor in sharpening the [1P2] in the other document.

564 Length

The class numbers of both the documents have the same 14 digits. But the simple device of Packet Notation implents exactly the semasiological import in the thought-content or the subject-name of the respective documents.

6 FAULT IN BC

BC has taken a great step forward in emphasising the need for classification being made serviceable in bibliographical service i e in documentation work. But its obsession with "Economic limit" for length of class number makes it deviate from its objective. The result is that to save a few digits, it overlooks the subtle differences among subjects. These subtle differences are not the creation of classification schemes. They are already there inherent in the thought-contents of the documents themselves. Whatever difference is recognisable in the idea plane should be brought out in the notational plane. Otherwise, classification will fail and chaos will prevail in arrangement.

61 Measure of Chaos

The measure of chaos may not be recognised when we have only a few documents. The seven documents will be placed together with the same class number, if they are classified by BC or UDC. We may not feel much hardship in numbering them all alike. But suppose there are a hundred documents of each of the different subjects. All the 100 documents will have the same number. When so many documents are actually produced, specialisation would have become sufficiently intensive, for a particular reader being interested only in the 100 volumes on one of the 7 subjects. They will not be found together. To that extent, documentation service will become inefficient. Service will not be exact, exhaustive and expeditious.

62 False Alarm

It is false alarm to condemn a classification scheme, because it is able to provide a co-extensive and expressive class number for micro thought of any degree of intension. It is pathalogical allergy to say that a scheme suited for documentation service of micro thought is not suited for ordinary library service of macro thought embodied in books, on the ground that it gives long numbers for micro thought. None of the seven subjects used in this paper is likely to get embodied in books, or at least in books to be taken by a public library or even a college or university library. There will be books, if at all, on Radar. Even that may be considered as very special. The class number for them will be merely D65,44 in CC, BOW in BC and 621.396.9 in UDC. These numbers are not long - certainly not in BC and CC. Any properly designed scheme will similarly give short numbers for books and long numbers for very specialised articles. There will be no need to use one scheme to classify books in general libraries and another scheme to classify articles in an abstracting periodical or any other documentation list.

63 Improper Opinion

It is improper for librarians working only in public libraries and other general libraries like university libraries to pronounce judgment over the depth-capacity of a scheme of classification. They should have the modesty to remember that they had seldom done documentation service to save time and to give full satisfaction to specialised research workers. No doubt, the librarians of such general libraries come into the field many decades before librarians having to do documentation service analysing articles in periodicals. The former are also more numerous than the latter. Their voice may, therefore, be louder. This is all improper. This is creating a cleavage in the profession. It has developed to ugly and great dimensions in some countries. It also accounts to some extent for the difficulty found in the Ifla and the FID pulling together amicably. The proper thing should be for them to be sections of a single international body.

64 Limit of Impropriety

Perhaps this is too far a cry, when there is not only so much misunderstanding about the possibility of one and the same scheme giving satisfactory results both to a general librarian and to a documentalist librarian, but people are so oblivious of their own ignorance and begin to hit others below the hilt. For an example of the limit to which impropriety can go, here are extracts from the review of BC by auniversity librarian, appearing in Library journal, 78, 1953, 1623-24:-

1 "Any one who sets out to make a modern library classification should have three major objectives in mind: (1) the system should render consultation of the shelves as easy as possible for reader, and staff; (2) it must facilitate those library routines that are dependent on it (e.g. the charging and discharging of books); and (3) its notation should lend itself to simple memorising and to accurate recording on call slips. Unfortunately the Bliss classification was not conceived along these lines, as the high-sounding title. attests". — This is the high-water mark of misunderstanding.

2 "The work can appeal only to those few who consider classification somewhat in the light of an intellectual game and who are ready to accept bizarre relationships". — This is not true.

3 "Bliss has received the aid of a number of librarians and others in developing some of the schedules, perhaps in an attempt to see that the system will be maintained in years to come. Nevertheless it is likely to become an orphan scheme". — This kind of review makes one see the wisdom of some creative writers praying in their prologue that their books should be saved from falling into the hands of those without wit to understand them.

DEPTH CLASSIFICATION

14. MANURE

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Studies 'manure' as a manifestation of one of the fundamental categories 'Energy', 'Matter' and 'Personality'. Considers 'manure' as a manifestation of Personality. Recommends [2P1] for manure.

1 MANURE

Manures were known and used from the earliest times. They were mostly excreta of farm animals, waste materials of plant and animal origin, and even human excreta. A scientific study of manure dates back to about two centuries. The work of the famous German chemist Gustav von Liebig developed the concept of plant food elements. This increased further the range of substances which can be used as manure. Increased research followed on these. Considerable volume of literature accumulated on these showing the proliferations of the subject and indicating that manure is an important entity in agriculture.

2 DEFINITION

Manures are materials added to soils to maintain or increase their nutritional quality. Their action may be direct, supplying the requisite substances for plant growth or indirect, acting upon substances already present, but not in a suitable condition for absorption or improving the physical condition of the soil or supplying the needs of the various soil organisms which bring about desirable changes in soil constituents. Manures enumerated below give an idea of the nature and range of substances used as such and included under the above definition.

CC No	Subject	UDC No
J:21	Organic manure	631.86/7
J:21(J)	Vegetable origin	631.87
J:21(J,5)	Green manure	631.874
J:21(J781,8)	Cotton seed meal	
J:21(λ)	Animal origin	631.86
J:21(λ,1)	Blood	631.86:637-66
J:21(λ,2)	Bone meal	631.852
J:21(λ,3)	Meat meal	631.86:637-5
J:21(λ,7)	Leather and skin waste	
J:21(λ,8)	Feather. Fur. Hair Horn. Hoof	631.86:637-62
J:22	Farm-yard manure	631.86
J:222	Cattle manure	631.86:636.2
J:223	Sheep manure	631.86:636.3
J:2296	Poultry	631.86:636.5
	Guano	631.854
J:24	Inorganic manure	631.83/5
J:241	Nitrate	631.842
J:2411	Ammonium	631.842.4
J:2412	Sodium	631.842.3
J:2414	Calcium	

J:242	Phosphate	631.85
J:2421	Superphosphate	631.855
J:246	Sulphate	
J:2461	Sulphate of Ammonia	631.841.1
J:248	Compound fertilisers special mixtures	631.89
J:249	Inorganic compounds	631.82
J:2494	Zinc	631.821.1
J:2496	Gypsum	631.821.2
J:29	Bye-product	
J:295	Oil cakes	631.876
J:29(F)	Industrial waste	631.876.9
J:29(F182)	Basic slag. Bye-products of steel industry	631.853
J:29(F54)	Brewery waste	631.876.2

3 ENERGY

In the light of the description of 'Energy' in section 3 of my article Depth classification 11. Soil : Is it 'Energy', 'Matter' or 'Personality', appearing on pages 40-42 of V. 2 of Ann. Lib. Sc., the concept manure does not lend itself to be considered as action, reaction, interaction, operation, way of manipulating, process, function, structure, a problem to be solved, a mode of work or approach. Therefore it is not to be regarded as a manifestation of the fundamental category 'Energy'.

4 MATTER

In the light of what has been said in section 4 of my article cited above, each manure listed in section 2 above may appear, at first sight to be a manifestation of 'Matter'. This however, is not so. This is elucidated in the next section.

5 PERSONALITY

Each one of the inorganic manure is a salt. Its nutritional and manurial properties are unique. These are important for the crop. Organic manures are practically of mixed composition. That is, they really add something of all the chemical substances (salts) that crop needs. They also add considerably to the texture of the soil. This is very helpful to the crop. A manure is thus useful to the crop for its intrinsic nutritional and manure qua manure attributes. It is studied as such in Agriculture. Its featuring or treatment never becomes significant as an ultimate part of some other commodity, with hardly any of the attributes of that commodity nor as specific to it. Therefore, as treated in agriculture, manure is not a constituent or manifestation of matter.

In my paper cited in section 3 above, the fundamental category 'Personality' is explained as follows: 'In the ultimate commodity which is the most concrete form of Matter, the individuating peculiarities are so many that it is more appropriate to group it with the category ''Personality'', if we can for want of suitable terminology, force this word to represent not only human personality, but everything- Human, Animal, Vegetable, Inorganic or other categories like Languages and Religion - which have an individuality and aroma of their own.'

In agriculture, each manure - organic and inorganic - is significant because of its intrinsic nutritional and manurial attributes which gives it an unique individuality and aroma. It is always (W) and construed as forming a universe of first level. Therefore, as treated in agriculture, manure is considered to be a manifestation of ''Personality''.

6 APPROACH

The traditional or canonial approach demands that in the arrangement on the shelves and in bibliographies, literature on manure qua manure without being related to any specific crop or group of crops should be placed anterior to literature on manures in relation to any specific crop or group of crops.

Manure is closely related to soil. It is added to the soil to make it available to the plant. Therefore soil and manure are closely related subjects. Helpful sequence demands also that literature on manure should be placed immediately after literature on soil.

7 FIRST ROUND

It has been shown in section 7 of my previous article on soil, that the crops - the prima facie personality in agriculture are to be accommodated in the first round as [1P1]. The levels or organs of [1P1] are to be accommodated in [1P2], [1P3] etc. Therefore we have to examine if manure could be accommodated in later rounds.

8 SECOND ROUND

Is manure germane to any one of the foci in [1E] ?

Isolate number 2 in [1E] is denoted in the verbal plane by the term manure. Energy focal term is to be one denoting action. The dictionary gives the following meanings connoting action: to make fertile, to enrich the soil, to render productive, to apply manure, to supply with fertilising material. The word manure lends itself for being used as the substantive term for the energy isolate number 2. Accordingly J:2 = Manure.

Manure is germane to isolate number 2 in [1E] and can be accommodated in [2P1] . The facet formula for manure will then be J: 2 [2P1] . The facet formula for soil is J:1 [2P1] . The facet formula for a book on crops will be J [1P1] . These will get arranged in the following sequence.

J:1 [2P1]
J:2 [2P1]
J [1P1]
J [1P1] : 1
J [1P1] : 2

The result is that literature on manure *qua* manure without relation to any specific crop or group of crops will be anterior to literature on manure for any specific crop or group of crops. This is in accord with the sequence required for manure by canonical or traditional approach in agriculture.

ABSTRACTING SERVICES IN MEDICAL SCIENCES

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Analyses the list of medical journals given in the World medical periodicals. The journals are examined on the basis of subject, country of publication, scrutiny by abstracting services, periodicity, etc. Percentages of unabstracted journals are worked out. Indicates how the indexing and abstracting services have not been able to achieve complete bibliographical control in the field of Medicine.

0 INTRODUCTION

The tremendous advances in the field of medical sciences which we are witnessing in the present century has, at least partly, been made possible by the great improvements in the methods of assembly, organization and dissemination of the accumulating medical literature. However, with all the indexing and abstracting services we have not as yet achieved complete bibliographical control of the field. An endless tide of information in the shape of books, theses, journal articles, trade literature, etc., is battering in with almost uncontrollable rapidity. The number of services for the bibliographic control of scientific literature is increasing year after year. One sometimes feels that there are too many such services in the field without any great advantage. The inadequacies of existing services may be summarized as:

1. Incomplete coverage of literature due to
   a) critical selection of periodicals to be covered,
   b) critical selection of articles to be indexed,
   c) certain unrepresented segment of literature such as unpublished theses, reports, trade literature, medical school bulletins, etc., and
   d) multiplicity of languages in which the original articles are published.

2. Duplication due to lack of cooperation among the services.

3. Time lag of anything from 4 months to two or three years from the first appearance of an article to the publication of its abstract.

4. Need for an efficient system of subject classification, standardized indexing and citation procedures.

5. Difficulties in getting the original articles quoted in the abstracts.

Some of the above points are discussed and illustrated in a comparison of two abstracting services for surgical literature in the Journal of documentation, December 1954, pp. 193-200.

1 WORLD MEDICAL PERIODICALS

The study of abstracting services presented in this paper is based on the information given in World Medical Periodicals, compiled by L. T. Morton, and published by WHO/UNESCO, 1953. It is quite certain that the four thousand and odd journals listed do not exhaust all the tiles in the field. For instance, for India the list gives 47 currently published titles while there are over a hundred titles current in India now; the German publication Periodica Medica, 1952, lists some 12, 000 titles including reports and other types of serials in the medical field. However, the world list may be taken to include all the important medical journals upto 1950, and the figure is quite impressive when we consider the fact that the ten abstracting services discussed put together do not cover over a thousand of the titles. "The list includes titles of all current medical periodicals which have been traced, all medico-biological periodicals regularly surveyed by certain abstracting agencies, as well as well known medical journals which ceased publication during the period 1900-1950" - Preface.

2 ABSTRACTING SERVICES

The abstracting services considered are: 1. American Medical Association (AMA); 2. Abstracts of World Medicine; Abstracts of World Surgery, Obstetrics and Gynaecology (AWM); 3. Biological Abstracts (BI); 4. Bulletin de l'Institut Pasteur (BIP); 5. British Abstracts AIII (BR); 6. Bureau of Hygiene (Bulletin of Hygiene, and Tropical Diseases Bulletin (BU); 7. Chemical Abstracts (CA); 8. Excerpta Medica (EM); 9. Nutrition Abstracts (N); 10. Semaine des Hopitaux (SH).

It may be noted that the once separate publications Abstracts of World Medicine and Abstracts of World Surgery, Obstetrics and Gynaecology have since 1952 merged under one title Abstracts of World Medicine. Also, British Abstracts AIII, published by the Bureau of Abstracts has now the new title British Abstracts of Medical Sciences (1954-).

The geographical distribution of the location of the abstracting services noted above is: Great Britain 4, U.S.A. 3, France 2, Netherlands 1.

Certain of the services under consideration, e.g. Tropical Diseases Bulletin, Nutrition Abstracts, Chemical Abstracts, etc., are limited to certain subjects and this, to some extent, would also limit the number of journals scrutinized and also the type of journals and articles abstracted by them.

3 ANALYSIS

31 By Agency

Table I gives the number of journals scrutinized by each of the agencies all by themselves; in other words the area in which there is no duplication. This gives a total of 650 journals. From Tables I and III it could be inferred that of the 3,516 currently published journals about 30 per cent is not covered by the ten services, while over 50 per cent is scrutinized by more than one of the services.

TABLE I

Abstracting Service	Number of journals scrutinized by the service only
American Medical Association (AMA)	144
Abstracts of World Medicine; Abstracts of World Surgery, obstetrics & Gynaecology (AWM)	152
Biological Abstracts (BI)	22
Bulletin de L'Institut Pasteur (BIP)	9
British Abstracts AIII (BR)	5
Bureau of Hygiene. Bulletin of Hygiene; Tropical Diseases Bulletin (BU)	6
Chemical Abstracts (CA)	133
Excerpta Medica (EM)	146
Nutrition Abstracts (N)	5
Semaine des Hopitaux (SH)	28
	650

32 By Place of Publication

Analysis by place of publication of the journals is presented in Table II. It gives in alphabetic order names of 89 countries from which the journals emanate, number of journals currently published in each of those countries, and the number not scrutinized by any of the above abstracting services as indicated in World Medical Periodicals. A grouping of the journals by larger geographical areas as presented in Table III is perhaps more informative. The geographical regions are Europe, Africa, Asia, Latin America, U.S.A. and Canada, Australia and New Zealand. Of the 1,630 journals currently published in Europe about 19 per cent are not scrutinized; in Asia 54.6 per cent of her 272 journals are unabstracted; in Latin America the percentage of unabstracted journals is 54.8 out of the 912 published journals; of the North American journals 13.6 per cent is not covered; for United States alone about one-eight the total number of periodicals published are not scrutinized, and many of these are local society or medical department publications. Of the 38 journals of Africa 5 are not covered while 18.2 per cent of the 22 journals from Australia/New Zealand are not scrutinized. For the whole world the figures are 1062 or 30.2 per cent of the 3,516 journals currently published are not covered by the agencies under discussion.

TABLE II

Country of Publication	Number currently published	Number not abstracted
Albania	1	1
Algeria	7	1
Argentina	207	94
Australia	19	3
Austria	31	7
Azerbaijan	1	1
Belgian Congo	1	..
Belgium	64	15
Bolivia	17	16
Brazil	212	105
British Guina	1	..
Bulgaria	14	8
Canada	48	11
Ceylon	3	..
Chile	68	40
China	54	46
Colombia	37	24
Costa Rica	5	3
Cuba	76	40
Cyprus	1	..
Czechoslovakia	36	12
Denmark	25	2
Dominican Republic	8	6
Equador	18	15
Egypt	8	3
Eritrea	1	..
Esthonia	1	..
Finland	12	2
France	231	24
French Equatorial Africa	1	1
French West Africa	1	..
Germany	187	39
Greece	24	16
Guatemala	5	4
Haiti	4	3
Honduras	3	3
Hongkong	2	1
Hungary	29	7
Iceland	1	..
India	47	9
Indonesia	4	1
Iraq	1	..
Ireland	5	..
Israel	8	3
Italy	267	25
Jamaica	2	1
Japan	124	89
Kenya	1	..
Korea	1	..
Lebanon	4	..
Lybia	1	..
Lithuania	1	..
Luxembourg	1	1
Malaya, F.M.S.	4	1
Mexico	91	53
Morocco	2	..
Netherlands	60	9
New Zealand	3	1
Nicaragua	5	5
Norway	9	2
Pakistan	2	..
Panama	3	1
Paraguay	8	6
Persia	3	2
Peru	37	13

Philippines	10	2
Poland	46	18
Portugal	44	10
Rumania	17	6
Salvador (El)	9	7
South Africa, Union of	12	..
Spain	99	19
Sweden	42	9
Switzerland	87	14
Thainland	5	4
Trieste	1	..
Trinidad & Tobago	1	..
Tunisia	3	1
Turkey	28	9
U.S.S.R.	47	10
Ukraine	10	3
United Kingdom	189	29
U.S.A.	591	76
Hawaii	3	..
Uruguay	50	3
Uzbekistan	2	1
Venezuela	39	24
Viet Nam	1	..
Yugoslavia	16	6

TABLE III

Region	Number of journals current	Number of journals unabstracted	Percentage of (3) to (2)
(1)	(2)	(3)	(4)
Europe	1,630	309	18.9
Africa	38	5	12.9
Asia	272	157	54.6
Latin America	912	500	54.8
U.S.A & Canada	642	87	13.6
Australia/New Zealand	22	4	18.2
	3.516	1,062	30.2

Journals from Asia and Latin America seem to fare worst. In Asia, however, the high percentage of unabstracted journals is mainly due to the high percentage of unabstracted journals of China and Japan (85% and 66.4% respectively). Many of these journals from these countries contain articles in the national languages and this may be one of the reasons for the high percentage of unscrutinized journals coming from there. That language may be one of the reasons for non scrutiny of journals by abstracting services is also borne out by the Greek journals. Many of the journals from Greece contain articles in Greek and the percentage of unabstracted journals for the country is as high as 66.7. On the other hand, from India almost all scientific writing is in English and the percentage of unabstracted journals is only 19.2 per cent (Of course, as already noted, the list does not contain all the Indian medical journals). The neglect of Latin American journals may be rather puzzling. The large number (912) of journals and the fewer (21) mergers or cessations might be an indication of great continued scientific activity of the area. However, there are not many worthwhile periodicals in the big list, many of them are published by individual doctors or clinics.

33 By Subject

Table IV analyses the position according to topics in the biomedical field. Under 83 alphabetically arranged subjects as per World Medical Periodicals, are given the number of journals currently published in each of the subjects and the number of unabstracted journals. A large number of titles because of their comprehensive coverage of the field cannot be assigned to any particular heading and so are grouped under the heading Medicine (General). A few journals find a place under Medicine as well as Surgery. This alphabetic arrangement of subjects may not be revealing much except for information on the abstracting of journals in individual subjects.

TABLE IV

Subject	Number of journals current	Number of journals unabstracted
Alcoholism	5	..
Allergy	8	2

Anaesthesia	9	1
Anatomy	22	4
Anthropology	10	..
Aviation medicine	8	..
Biochemistry	30	1
Biology, General	78	6
Cancer	42	14
Cardiovascular system	39	5
Chemistry	18	1
Dermatology	43	8
Diabetes	3	..
Embryology	8	...
Endocrinology	32	7
Entomology	5	..
Epidemiology & Vital Statistics	5	10
Gastroenterology	26	4
Genitourinary system	30	8
Geriatrics	2	..
Gynaec. & Obst.	86	7
Haematology	10	2
Heredity	20	1
Histology	14	2
Hist. of Med.	20	7
Hospitals	16	3
Hydrology & Climatology	8	4
Hygiene & Pub. Health	206	106
Immunology	20	2
Indus. Hygiene	47	10
Infectious Dis.	12	3
Insurance Med.	4	1
Jurisprudence, Medical	21	8
Leprosy	17	10
Malaria	9	2
Maternity & Child Welfare	9	5
Medicine, General	1020	420
Medicine, Bibliog.	7	1
Medicine, Ethics	3	1
Medicine, Experim.	55	5
Medicine, Organization & Policy	16	1
Microbiology	52	6
Microscopy	7	..
Military & Naval Medicine	52	21
Mycology	3	1
Neurology & Psych.	141	36
Neurosurgery	9	2
Nutrition	44	9
Occupational Ther. & Rehabil.	5	3
Odontology	155	94
Ophthalmology	97	30
Orthopaedics	29	2
Otolaryngology	71	13
Paediatrics	129	36
Parasitology	27	3
Pathology	60	13
Pharmacology	26	7
Pharmacy	94	15
Photography	3	1
Physical Educ.	7	4
Physiology	42	5
Physiotherapy	15	4
Plastic Surgery	5	2
Proctology	3	..
Psychology	33	3
Radiology	46	12
Respiratory sys.	18	..
Rheumatism	11	..
Science, General	43	1
Serology	5	1
Sexology	5	3
Social Medicine	27	8
Speech Disorders	5	..
Stomatology	23	7
Surgery	191	48
Technical Meth.	5	..
Therapeutics	43	6
Toxicology	2	..
Tropical Med.	41	6
Tuberculosis	84	18
Venereology	42	10
Veterinary Med.	60	18
Zoology	15	1

34 By Preliminary Disciplines

In Table V the grouping is according to broader headings:

1. Disciplines preliminary to the study of medicine: the percentage of unabstracted journals varies from 2.4 (Science) to 16.7 (Anatomy).

2. General medical journals, Pathology, Hygiene and Preventive medicine: Here the percentage of unabstracted journals is about 40.

3. Regional diseases: The percentage of unabstracted journals varies from 5 (Locomotor system) to 30.2 (Reproductive system) with an average of 20 per cent.

4. The specialities (excluding Dentistry): The percentage of unabstracted journals varies from 12.5 (Obstetrics and Gynaecology) to 33 (Ophthalmology).

Dentistry needs to be considered as a separate speciality not within the purview of the above abstracting services.

It would appear that disciplines preliminary to the study of medicine particularly the general sciences, viz. Science, Chemistry, Biology, Zoology, are the most well covered by the abstracting services. However, it is to be remembered that the list contains only the "medico-biological periodicals regularly surveyed by certain abstracting services." Secondly, among the services under consideration are Chemical Abstracts and Biological Abstracts which are fairly comprehensive in their respective fields (scrutinizes over 5230 journals and BI about 4,500).

Group 2, General medical journals, etc., which contains the largest percentage of unabstracted journals has a large number of the unabstracted journals from Latin America, China and Japan.

Articles pertaining to the history of medicine appear also in periodicals other than those devoted purely to medical history. For the medical historian a separate indexing or abstracting service collecting all these papers may be most helpful. We do have now one such service in Current Work in the History of Medicine (1954-) published by the Wellcome Historical Medical Library.

TABLE V

Subject	Number of journals current	Number of journals current	Percentage of (2) to (3)
(1)	(2)	(3)	(4)
Group 1			
Science	43	1	2.4
Chemistry	18	1	5.6
Biology	113	7	6.3
Biochemistry	30	1	3.3
Zoology	15	1	6.7
Microbiology	242	39	16.1
Medical Technology	8	1	12.5
Anthropology	10	..	..
Anatomy	36	6	16.7
Physiology	50	5	10.0
Group 2			
Pathology & General Med.	1,221	461	37.8
Hygiene and Public Health	350	148	42.2
Group 3			
Respiratory system	76	13	17.1
Cardiovascular system	39	5	12.4
Haematopoetic system	10	2	20.0
Gastrointestinal system	52	11	21.1
Endocrine system	32	7	21.9
Locomotor system	40	2	5.0
Urogenital system	30	8	26.7
Reproductive system	47	13	30.2
Neurology & Psychology	188	41	21.8
Group 4			
Surgery	257	72	28.0
Obst. Gynaec.	95	12	12.5
Paediatrics	129	36	28.0

Dermatology	43	8	18.6
Ophthalmology	97	30	33.0
Forensic Med. & Toxicol.	23	8	35.0
Tropical Med.	41	6	14.6

35 By Periodicity

The journals, excluding indexing and abstracting journals, indicated as currently published are grouped into Weeklies, Bimonthlies, Monthlies, etc. In the group of Weeklies are included those journals issued 40-85 times a year; Monthlies include those issued 8-14 times a year; those issued 3-4 times a year are included in the Quarterlies, while those issued 5-7 times a year are in the Bimonthlies. In the category of 'Unknowns' are those journals for which no information as to frequency is given in the list.

From the appended table it may be seen that Monthlies form the most numerous, 29.4 per cent of all types; then come the Quarterlies (19.9 per cent) and then the 'Unknowns' (14.5 per cent). If the 'Irregulars' and 'Unknowns' are considered together, the combined group would be the second most numerous type (26.6 per cent).

The number of journals not scrutinized by the three abstracting services Abstracts of World Medicine (AWM), American Medical Association (AMA), and Excerpta Medica (EM) were counted in each of the groups. Coverage by the three services collectively is highest in the case of Quarterlies, over 90 per cent of the journals being scrutinized; the next best coverage is for Weeklies and Bimonthlies (81 per cent in each category). For the 508 journals of the 'Unknown' group no indication of abstracting by the services is given. Nearly half the number of the Irregulars are not covered by the three services. In the combined group of Irregulars and 'Unknowns' the percentage of unscrutinized journals is over 75 per cent.

Incidentally the Table indicates that the three services AWM, AMA, EM scrutinize collectively only 60 per cent of the journals listed.

TABLE VI

Type	No. currently published	Percentage to total number of journals	Number of journals not scrutinized by AWM, AMA, EM	Percentage of 4 to 2
1	2	3	4	5
Weeklies	85	2.4	16	19.0
Semi-monthlies	85	2.4	35	41.1
Monthlies	1,016	29.4	293	28.8
Bimonthlies	464	13.3	88	19.0
Quarterlies	687	19.9	61	8.9
Half-yearlies	58	1.6	17	30.0
Yearlies	165	4.6	59	35.8
Irregulars	420	12.0	199	47.4
Unknowns	508	14.5	508	100.0
	3, 487		1,376	39.4

4 COVERAGE

Complete and absolute coverage of medical literature is neither possible nor is it absolutely essential. There will always be a few papers which will have to go unindexed at least from the point of view of keeping the cost of the services at a reasonable level. That there is need for better coverage of journals as well as articles is quite evident. That there is need for co-operation among the services has long been stressed. In Table VII the extent of duplication of journal titles between AMA, AWM, and EM are indicated; if we are to consider the journals scrutinized by these three services alone then the percentage of duplication will be higher.

TABLE VII

Abstracting Services in combination	Number of journals scrutinized by the services in combination	Percentage of the number of journals scrutinized by the combination to total number of journals scrutinized by the 10 services
AMA, AWM, EM	779	31.8
AMA, AWM	1,044	42.6
AMA, EM	900	36.7
AWM, EM	953	38.7

We have noted that for various reasons there is a time lag of 4 months to years from the time of publication of a paper to the publication of its abstract that certain of the services scrutinize over a hundred journals all by themselves. Hence for comprehensive bibliographical search we have to look into all the services with the hope of getting a few more references from the non-duplicated journals and also that in one service certain articles would be indexed earlier than in another.

Publication of articles in languages not 'popular' in the scientific world has, as already noted, been one of the reasons for non-scrutiny of some journals by the abstracting agencies. On the other hand one can make out a case for the agencies publishing English abstracts devoting special attention to these articles giving as full abstracts as possible.

BIP, BR, BU, N, SH add only 53 fresh titles to the list covered by AMA, AWM, BI and CA. The last mentioned covers mostly chemical and pharmaceutical journals and the field may be left to it; although on its list of journals for scrutiny are many medical journals it is expected that it would abstract only those articles which fall within its subject purview avoiding duplication with the general medical abstracting services. The extent of duplication between BR, certain section of BI and EM Sec. 2 must be quite appreciable.

For clinical medicine and surgery we have AMA, AWM and EM. AWM although scrutinizes quite a large number of journals, is very selective of the papers. The 144 journals scrutinized by AMA alone are mainly those of U.S.A. and South America. Since its inception in 1947 EM has expanded into several sections and greatly improved in the matter of coverage of journals as well as articles. There is much scope for its improvement, it is true, but it is becoming more and more accepted as a comprehensive medical abstracting service in the English speaking world (See also, Journal of Documentation, December 1954, pp. 193-200).

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DEPTH CLASSIFICATION *

15. ZONES IN ARRAYS OF ORDER 2

S. R. RANGANATHAN

Studies the utilisation of the zones in arrays of order 2. Points out its variegated nature. Indicates the incidence of telescoped facets in some cases, resulting in an apparent divergence between the idea and the notational planes. Examines the anomaly in the allocation of Canonical Classes and Systems among the zones in Fine Arts. Discusses a method of grouping and enumerating, with the aid of Octave Notation in zone 2 and of Group Notation in Zone 3, of the residual applied sciences usually denoted by "Arts and Crafts".

0 INTRODUCTION

In my preceding article of this series, four zones were recognised in an array, as viewed from the idea plane. Zones 1 and 4 are made of categories common to many host classes. Zones 2 and 3 are made of categories special to each host class. The categories in zones 1 and 2 need enumeration. But the categories in zones 3 and 4 are generally got by alphabetical or chronological or subject device. As viewed from the notational plane, in CC the first significant digit is (1) Roman small in zone 1; (2) Arabic numeral in zone 2; and (3) Roman capital in zone 3. Zone 4 has packet notation; that is, the first digit is starter bracket; and the entire number enclosed in brackets function as if it were of a single digit. At present, CC alone has a notational system with four species of substantive digits to mark off the four zones of an array. Therefore CC is the only "guinea pig" with which to study, experiment, and explore Zone Analysis. The use of a particular guinea pig is always unavoidable; but it does not take away from the generality of the findings. These findings may be of help in the improvement of existing schemes of classification, along systematic and rational lines controlled and regulated by intellect with the aid of formulated postulates and directives. The findings may also throw light on the foundations of the General Theory of Classification in the idea plane as well as the notational and verbal planes. The cumulation of this experience may pave the way for the creation of a new scheme of classification more versatile than any of the existing ones, as an act of intuition under the stimulus of the new findings in the apperception mass.

01 Array of Order 1

There is and can be one and only one array of order 1 in the universe of knowledge taken as the original universe. The utilisation of its four zones was studied in article 10 of this series. Naturally, it was a relatively simple affair. It opened up a vast terrain in the array to receive and place in a more or less helpful sequence any number of new main classes - mostly of the nature of abstract methodology - getting distilled out of the less abstract main classes in our own days and in the future. This is an immediate and welcome benefit of the study of Zone Analysis.

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* Continued from *An lib sc* 2, 1955, 88.

02 Arrays of Order 2

Obviously, an array of order 2 in the universe of knowledge taken as the original universe is an array of order 1 of the main class which is its immediate universe. Thus, each main class gives rise to an array of order 2 of the universe of knowledge taken as the original universe. Thus, the number of arrays of order 2 is equal to the number of main classes. In CC, there are 36 main classes fitted with detailed classification and facets. In the forthcoming edition 5, it enumerates many other main classes in zones 2 and 4. Theoretically, their potential number is large. Thus the number of arrays of order 2 is large. We may, therefore, expect many alternative methods for utilising the four zones. We shall begin with a review of the way in which they have been intuitively used in the several main classes. We shall then examine whether any improvement can be made intellectually. This will be equivalent to the polishing and final touch given to the work of art. Some definite methods of utilising the zones may suggest themselves and get crystallised. These may be of use in utilising intellectually the zones in the arrays of order 2 to be newly established and in arrays of higher orders. That is a recognised procedure in scientific method.

1 ZONE 1

As a rule, Zone 1 in any array of order 2 is made of anteriorising common isolates denoting approach materials of the host class. The first significant digit in the zonal number is a Roman small. There is, however, one exception to the general rule. This exception happens in the main class "z Generalia". In this case, zone 1 appears vacant as viewed from the notational plane. This is the result of the special rule that the main class digit z should be omitted and taken as understood from the class number of any approach material of the host class z. Thus an apparent discrepancy is created between the idea plane and the notational plane in zone 1 of array of order 2 having "z Generalia" as the immediate universe.

2 ZONE 2

Zone 2 in an array of order 2 is much more varied than zone 1. Its make up depends on the main class forming the immediate universe of the array. However the number of patterns of the make-up is only small. It is only about five. Some changes suggest themselves in the case of the main classes "D Engineering", "N Fine Arts", and "M Arts and Crafts".

21 Unoccupied in Notational Plane

Zone 2 in array of order 2 is left unoccupied in the notational plane, when the immediate universe is any of the following 6 main classes:-

A Natural sciences
β Mathematical sciences
Γ Physical sciences
ℳ Humanities and social sciences
ν Humanities
Σ Social sciences

Each of these main classes appear to be a class of the array of order 1, only in the notational plane. In the idea plane, however, each of them is a partial comprehension of two or more of the main classes following them in the schedule as enumerated. Thus, these succeeding two or three main classes are in reality canonical divisions of the partially comprehensive main class concerned. To avoid violation of the Canon of Exclusiveness and the incidence of cross-classification, none of the above-mentioned six partially comprehensive main classes gives rise to array of order 2 in the notational plane. The classes of order 2 in the idea plane get telescoped along with the immediate universes into the simple array of order 1, as viewed from the notational plane.

22 Unoccupied in Idea Plane

We have the obverse of the above pattern in certain main classes. Zone 2 in array of order 2 is unoccupied in the idea plane but occupied in the notational plane, when the immediate universe is array of the following 23 main classes:-

Z Generalia
2 Library science
E Chemistry
F Technology
G Biology
η Mining
I Botany
J Agriculture
K Zoology
λ Animal husbandry
L Medicine
Δ Spiritual experience
O Literature
P Linguistics
Q Religion
S Psychology
T Education
U Geography
V History
W Political science
X Economics
Y Sociology
Z Law

Each of the above 23 main classes is by itself a basic class. That is, the classification of each of them is, from the very outset, on the basis of a train of characteristics, yielding a facet to be attached to it. Therefore, the array of order 2 - i. e. the array following the main class digit - apparent in the notational plane, is really the array of order 1 in the personality facet of level 1 of round 1. In other words, none of these 23 main classes has a second order array intrinsically belonging to it, as viewed from the idea plane. But the rules about omitting the connecting symbol and taking it as understood in the case of the personality facet of first level of first round creates an illusion in the notational plane. In that plane, the array of order 1 belonging to the facet as viewed from the idea plane, appears as if it were the array of order 2 intrinsic and attached to the main class digit.

221 Example 1

Consider "23 Academic library". In the notational plane, 3 appears as if it were a focus in array of order 2 in a basic class having 2 as the first digit and thus intrinsic to 2. But in the idea plane, it really represents an isolate in array of order 1 in the Library Facet forming the personality facet in level 1 of round 1.

222 Example 2

Consider "T4 University education". In the notational plane, 4 appears as if it were a focus in array of order 2 in a basic class having T as the first digit and thus intrinsic to T. But in the idea plane, it really represents an isolate in array of order 1 in the Community Facet forming the personality facet in level 1 of round 1.

223 Example 3

Consider "Z1 International law". In the notational plane, 1 appears as if it were a focus in array of order 2 in a basic class having Z as the first digit and thus intrinsic to Z. But in the idea plane, it really represents an isolate in array of order 1 in the Community Facet forming the personality facet in level 1 of round 1.

23 Occupied in Idea and Notational Planes

Zone 2 of array of order 2 is occupied both in idea and notational planes, when the immediate universe is any of the following 4 main classes:-

B Mathematics	H Geology
C Physics	R Philosophy

The classification of each of the above 4 main classes has to be, in the first instance, along canonical or traditional subdivisions, not based on a characteristic or a train of characterists. Therefore the array of order 2 immediately arising out of the main class belongs to it intrinsically. Thus its zone 2 is occupied in the idea plane. Further the second digit in the class number is an organic part of it in the notational plane also. In fact, the resulting canonical class forms a basic class, unless of course it has to be further divided along canonical lines. For example, in "B1 Arithmetic", "B2 Algebra", "B3 Analysis" etc. the foci '1 Arithmetic', "2 Algebra", "3 Analysis" etc. are canonical subdivisions of the main class "B Mathematics". They thus intrinsically belong to it, both in idea plane and in notational plane. Similarly in "H1 Mineralogy"..."H6 Palaeontology", and "H7 Economic geology", "1 Mineralogy"..."6 Palaeontology", and "7 Economic geology" in the array of order 2 belong intrinsically to the main class "H Geology" both in the idea plane and in the notational plane. In fact "Mathematics" "Physics", "Geology" and "Philosophy" are traditional names for the respective bundles of canonical classes.

24 Undeveloped Main Classes

Hardly any of the main classes in zone 4 of the array of order 1, and many of those in zone 2 have been provided with classification schedules - that is either intrinsic or canonical subdivisions or facet formulae. These main classes are taking shape only just now. Literary warrant is slight. It does not press attention on them. But for the recent development of documentation with emphasis on micro thought, they might not have been even recognised for enumeration in the schedule of main classes. As stated in section 01, they are just being isolated as distillates of pure methodology involved in main classes and common isolates of less abstraction. The packet numbers denoting these in zone 4 are each to be treated as if being a single digit. It is conjectured that each of them will be a basic class by itself. In other words, it will not have an array of canonical subdivisions; that is zone 2 of the array having it as immediate universe will not be occupied in the idea plane. Its division will have to be based at the very outset on a train of characteristics. This will of course, result in an illusion in the notational plane as if zone 2 is occupied, though in reality the zone 2 of the array of order 1 belong to the personality facet of level 1 of round 1.

25 Engineering

In edition 4 and the earlier editions of CC, "D Engineering" has been featured as being divided, at the very outset, on the basis of a train of characteristics. This has not been happy. Engineering is much like a bundle of conventional or canonical classes, as the main classes treated in Section 23.

Further, literary warrant wants a partially comprehensive canonical class viz. "Civil Engineering". Therefore, it is proposed to begin the classification of Engineering with canonical divisions in the first instance as follows:-

D1 Civil engineering
D2 Irrigation
D3 Building
D4 Track
D5 Vehicle
D6 Mechanical
D7 Nuclear
D8 Sanitary

Each of these becomes a basic class. Each will admit a facet formula. As a result, zone 2 of array of order 2 with Engineering as immediate universe will be occupied both in the idea and in the notational plane.

3 ZONE 3

Zone 3 of array of order 2 has not yet been utilised in all cases. Where they have been, the last and the penultimate octaves have been used for different purposes. Moreover different devices are used to derive the categories in them.

31 Systems

The last octave in zone 3 in array of order 2 is occupied in the notational plane but unoccupied in the idea plane, when the immediate universe is any of the following main classes:-

C Physics
J Agriculture
L Medicine
S Psychology
T Education
X Economics

The focus in the last octave is got by chronological device. It denotes the "System" of exposition or school of thought of the main class, which took shape in the epoch used for the chronological device. Here are examples:-

CK Gravitation theory
CM Kinetic theory
CM9 Electron theory
CN Relativity theory
CN0 Quantum theory
CN2 Wave mechanics
JB Forestry
LB Ayurveda
LC Siddha
LD Unani
LL Homoeopathy
LM Naturopathy
SM Experimental psychology
SM Psycho-analytic-psychology
SN Gestalt psychology
SN1 Behaviouristic psychology
SN14 Individualistic psychology
SN17 Reflexology
SN2 Eidetic psychology
SN3 Field psychology
XM Co-operation
XN Public utility economics
XN1 Guild socialism
XN17 Communistic economics

311 Favoured System

There can be no exposition of a main class except according to some system. A main class is inaffable if no system is allowed. In other words, there can be no document whose class number is the bare main class digit. But it cannot be allowed to run to waste. This is taken along with the following demand of helpful sequence. That system which has the greatest literary warrant at a time should be given precedence over all other systems. This is the favoured system. By the application of the Principle of Burnt Chariot and Lost Horse the bare main class digit is used to represent the favoured system. Thus C is used to denote Newtonian physics or classical physics as it is called. L is used to denote allopathy. S is used to denote classical psychology. X is used to denote capitalistic economics. No doubt, the favoured system will change with time. This will involve change of class number in the documents placed in the displaced favoured system. But this will happen only at long intervals, perhaps extending over some centuries.

312 Telescoped Facet

In the preceding article of this series, it has been shown that the focus called "System" appears to belong to zone 3 of array of order 2, only as viewed from the notational plane. Viewed from the idea plane, it really belongs to zone 3 of a separate facet - the System Facet otherwise also called Amplifying Facet. In the System Facet, zone 2 of array of order 1 is not occupied in the idea plane. In the array of canonical divisions and in the array of order 1 in personality facet in level 1 of round 1, as the case may be, zone 3 is not occupied in the idea plane. This makes it possible to telescope the System Facet and either the array of canonical divisions or the personality facet in level 1 of round 1, as the case may be. Such a telescoping leads to economy in the length of the class number of the commonly occurring books and other forms of document. This economy is particularly helpful in public library collections. No doubt this economy is got by sacrificing a zone in each of the kinds of arrays considered in this section. It is believed that this sacrifice is worth making.

313 Disjunctive Incidence

It is possible to have a book with treats of several systems disjunctively - that is, it may devote a chapter, say, to each of several systems. The digit A is used in zone 3 of the array of order 2 in the class number of such a book. For example, a book giving a chapter on each of psycho-analysis, behaviourism, reflexology and field psychology will have the class number SA.

314 Other Main Classes

It has to be examined if the other main classes admit of this use of the last octave of zone 3. Perhaps "E Chemistry" does. We want a number for Alchemy. It may be ED. In "W Political science", system perhaps corresponds to what has been called Type of State. If so, system gets represented in zone 2, leaving zone 3 free. In "R Philosophy" also, systems have been represented in zone 2. For example, bare digit R is used for Modern European System. Thus we have

6 Second favoured system
7 Third favoured system
8 Other favoured systems.

Perhaps there will be some economy and certainly uniformity of treatment if these are accommodated in zone 3. But then there is a difficuluty. Most of the philosophical systems get individualised geographically rather than chronologically. The sub-systems in a country's system of philosophy cohere together, so that they are better shown together. Further, there are not more than 5 canonical divisions of "R Philosophy". This explains the accommodation of systems in zone 2. Thus here again zone 3 is left free. We have to find use for zone 3 in these main classes and the other main classes which do not admit of the concept "System", because there is only one system possible. The main classes "N Fine arts" and "M Arts and crafts" are considered from section 5 onwards.

32 Specials

The penultimate octave in zone 3 in array of order 2 is occupied in the notational plane but unoccupied in the idea plane, when the immediate universe is one of the following main classes:-

A Sciences
C Physics
D Engineering
J Agriculture
λ Animal husbandry
L Medicine

The focus in the last octave represents a "special". A special is a treatment of the main class either within an unusually limited range of one of its characteristics or of its incidence in a special context, provided it has literary warrant. It involves abnormal results as a rule, demands methods different from the normal ones, and perhaps even calls for trains of characteristics and schedules special to itself and provided that, unless treated as a special, cross classification will result. Here are some examples:-

A9V Defence science
C9B3 Nuclear physics
C9B37 Meson physics
C9B4 β-ray
C9B41 Positron
C9B6 Physics of surface
C9B71 High vacuum physics
C9B78 High pressure physics
C9D1 Low temperature physics
C9F8 High potential physics
D9V4 Military engineering
J9D2 Dry farming
λ9V4:4 Army veterinary
L9C Child medicine
L9F Obstetrics and gynecology
L9H Tropical medicine
L9S Navigation medicine
L9T Aviation medicine
L9V Defence medicine
L9X Industrial medicine
S9V War psychology
W9V War time government
W9W Revolution
X9V War time economics

321 Scheduling

The scheduling for the "specials" has now to be done by mere enumeration. A convention may be developed, as experience grows, somewhat on the following lines. The 20 letters of the Roman capitals may be equitably allocated to abnormal ranges of incidence of characteristics belonging respectively to the five fundamental categories of attributes related to the canonical divisions, if these are relevant. This is illustrated in the specials of "C Physics", and "J Agriculture". Or, an oblique scheduled and unscheduled mnemonics may be adopted. This is illustrated in the specials of different main classes related to defence and war. Much work has to be done before a helpful method of scheduling can be finalised.

322 Dark Region

There are some dark regions needing investigation. These arise by the rival claims of (1) the idea of specials, (2) phase relation, and (3) the idea of quasi isolates made of a non-favoured first characteristic accommodated in the second or later octaves of zone 2 of array of order 1 in a facet. Sufficient depth classification is not now practised by documentalists to provide sufficient experience to realise the existence of such dark regions or to control them. But literary warrant is growing in quantity. Theoretical exploration of the dark regions should be checked up by actual helpfulness of the resulting sequence got by more intensive depth classification.

323 Analogy with Systems

All the remarks made in sections 311 to 314 regarding favoured systems, telescoped facet, disjunctive incidence, and the other main classes have their analogues in the study of the formation of specials also.

4 ZONE 4

The creation of zone 4 in an array with the aid of packet notation has been too recent to be put to use in an array of order 2. It is conjectured that the use of subject device to fill the brackets immediately after the main class digit is not likely to be warranted by the idea plane. Therefore, the foci in zone 4 of an array of order 2 may have to be got by enumeration. Apart from this conjecture, it has to be left to future as to how this zone is to be utilised. At present we have to leave this zone fallow. If cultivated in a filiatory fashion, it will add considerably to the capacity of the scheme of classification. There can be no limit to the surprises in the development and structure of the universe of knowledge. Therefore, the presence of a fallow region in an array is not unwelcome in a scheme of knowledge-classification.

5 FINE ARTS

The picture is becoming increasingly clear in respect of the utilisation of first octaves and last octaves after the emergence of the concept of zone. Application of the ideas developed in regard to the utilisation of zones 2 and 3 in an array of order 2, in the preceding sections, leads to the solution of a difficult problem faced in the main class "N Fine Arts". It is concerned with the "Style Facet".

51 Style

"System" becomes "Style" when applied to "N Fine Arts". Style does not get individualised merely by chronological device, as it is in a science. For science is international; it is not affected by national or cultural barrier. But fine art is essentially dyed by the distinctive features of a people. Therefore style in fine arts has to be individualised first and foremost by geographical device. Chronological device too is necessary. Because in course of time several styles take shape in one and the same country. For example, in India we have Jain style, Buddhistic style, Pallava style and so on. But the chronological device should only follow the geographical device, as chronologically distinguishable styles are generally variants of the style peculiar to a nation. Thus, style number in fine arts has to begin with an Arabic numeral. In the notational plane, it therefore occupies zone 2 of array of order 2. Thus in effect, "System" gets transferred from zone 3 to zone 2 in fine arts.

52 Canonical Divisions

Reciprocally, the canonical divisions of "N Fine Arts" have to be transferred to the last octave of zone 3, as viewed from the notational plane. The following schedule gives the old numbers and the proposed numbers of the canonical divisions:-

CC Number		Canonical Division
Proposed	Old	
NA	N1	Architecture
NB	N1, 1	Town-planning
NC		Plastic art
ND	N2	Sculpture
NE		Lapidiary art
NF	N2, 7	Numismatic art
NG		Mould art-work
NH	N6	Ceramic art-work
NJ		Inlay art-work
NL		Embroidery
NM	N4	Graphic art
NN	N3	Engraving
NP	N4	Drawing
NQ	N5	Painting
NR	N8	Music
NS	N7	Dance
NT	N91	Theatre
NU		Puppet play
NV		Shadow play
NW	N915	Cinema
NX	N9153	Talkie

The transfer of the canonical divisions to zone 3 has increased the capacity of the notation. It has been possible to provide for the partial comprehensions plastic arts and graphic arts. Literary warrant demands them.

53 Telescoping

In the notational plane, the style numbers belonging to a facet and the canonical division numbers belonging intrinsically to the main class get telescoped in array of order 2. But they do not really belong to one array in the idea plane. If both canonical division number and style number are needed in the class number, they get separated into different arrays. The canonical division number stays in array of order 2. The style number goes to the next array, which is really array of order 1 in the geographical facet forming the first facet in style facet. Here are examples:-

N44	Indian art
N44, C	Indian Buddhistic art
ND	Sculpture
ND44	Indian sculpture
ND44, C	Indian Buddhistic sculpture

54 Disjunctive Incidence

If a document deals with the styles of several countries disjunctively, the isolate number in the geographical facet of the style facet should be the disjunctive number 1-1. For example

N1-1	Disjunctive account of art style of many countries
ND1-1	Disjunctive account of style of sculpture of many countries

If a document deals with the styles of different epochs of one and the same country, the isolate number in the chronological facet of the style facet should be A. For example,

ND44, A Indian styles of sculpture of different epochs treated disjunctively.

6 APPLIED FIELD

The field of application of natural sciences and of certain arts and crafts associated with them baffles every scheme of classification.

Even in the verbal plane, there is no agreement among the schemes in denoting some filiatory groups of them. In UDC, the term Useful Arts denotes the entire field plus the art of management which is not an application of natural sciences. In LC, the term Technology is used as the equivalent, excluding agriculture, animal husbandry, medicine and management. In CC, the term Useful Arts denotes all applications except engineering, chemical technology, mining, agriculture, animal husbandry and medicine. It also includes military science and recreations. In BC the term Industries is used to denote the applications of science included in the Useful Arts of CC.

61 Considerable Literary Warrant

The following are the applied sciences with considerable literary warrant from the very early times:-

Subject	CC No.	UDC No.	LC No.	BC No.
Engineering	D	62 & 69	TA to TL	BM to BO, BR, BT, UE to UR, UY
Chemical Technology	F	66	TP	CT to CY
Mining	η	622	TN	UD
Agriculture	J	631 to 635		UA to UB
Animal Husbandry	λ	636 to 639		UC
Medicine	L	61		HD to HZ

In each of the schemes, the classification of these subjects has been worked out in detail. They are further given the status of main classes by CC even in the notational plane.

62 Later Literary Warrant

Most of the other subjects in the applied field are acquiring literary warrant only in recent years. They owe it to the joint pressure of industrial revolution, technocracy, over-population in relation to near-natural commodities. democracy, and productivity-drive. The first three factors led to the production of micro documents. The last two are leading to macro documents also being produced in every conceivable art and craft, and industrial or manual production. Many of these new subjects have not yet been provided with detailed classification in any scheme. Some have not been even enumerated.

63 Compact Grouping

Every scheme tries to organise them with groups. These groups themselves are arranged consecutively, as shown by the numbers assigned to them. Here are the numbers:-

UDC	LC	BC	CC
67, 68	TR to TX	US to UX	M

The above numbers show that CC has improvised a hold-all main class to comprehend al all the arts, crafts and industries, other than the six mentioned in section 61. The diverse groups on subjects appear in array of order 2 to in CC and in arrays of order 3 in the other schemes. The difficulties arise only in these arrays of order 2 or 3 as the case may be.

64 UDC

The schedule of UDC is as follows:-

67	Industries and manufactures
671	Articles of precious metal and precious stone
672	Articles of iron and steel
673	Articles made of copper and its alloys
674	Wood manufactures
675	Leather industries
676	Paper making industry
677	Textile industry
678	Rubber industry. Articles made of rubber
679	Miscellaneous minor industries
68	Various trades, industries and professions
681	Fine mechanism. Precision instruments. Musical instruments
682	Small forge work. Horse shoeing. Iron work for building
683	Ironmongery. Locksmith's work

684	Coach building
685	Harness. Shoe making. Glove making
686	Book binding. Mirror making. Stationery
687	Clothes making industry
688	Various small industries

The terminology is verbose and unfit for chain procedure. The difference between 679 and 688 can not be seen except by examining the enumeration of subjects under them. 686 is an odd grouping. Alphabetical device is rightly avoided. But the numeral notation stands overpowered by the number of subjects. Many subjects do not get enumerated even in arrays of higher orders.

65 LC

The schedule of LC is as follows:-

TS	Manufactures
TS200 to 780	Metal manufactures
TS800 to 915	Lumber and woodwork
TS940 to 1067	Leather industries
TS1080 to 1220	Paper manufactures
TS1300 to 1935	Textile industries
TS1950 to 2283	Miscellaneous industries (arranged in alphabetical sequence)
TS2301	Various minor industries (not made of any one material) to be individualised by alphabetical device
TS2301.C7	Copying presses
TS2301.T7	Toys etc
TS2301.U5	Undertakers' supplies etc
TT	Mechanical trades - Arts and crafts
TT180 to 203	Wood-working
TT205 to 270	Metal-working
TT290	Leather work
TT300 to 380	Painting, varnishing, guilding etc
TT390 to 845	Clothing manufacture
TT855 to 894	Decorative hand work
TT950 to 979	Barber's work
TT980 to 999	Laundry work

The terminology is crisp and fit for chain procedure. Evidently, the grouping is based on the actual collections of the Library of Congress at the time this schedule was formed. Perhaps the difference between TS and TT is in the extent of the use of machinery and the size of the scale of operations possible.

66 BC

The schedule of BC is as follows:-

US	Mechanic arts and trades
USB to USG	Wood work
USH to USV	Metal work
USY	Other trades to be arranged alphabetically
UT	Manual arts and trades
UTA to UTC	Arts and crafts
UTD to UTF	Masonry
UTG	Wall-papering
UTH	Painting and varnishing
UTP	Ceramic industries
UTQ to UTS	Upholstery
UTT	Printing industry, job printing
UTY	Special industries and trades to be arranged alphabetically
UU	Textiles
UV	Industries, trades, manufactures (Residual industries)
UVC to UVF	Clothing industry
UVG to UVH	Shoes, leather industry
UVT	Rubber goods
UVK	Food industries
UVP	Paper industry
UVQ	Furniture industries
UVW	Wood industries
UW	Residual industries, trades, manufactures (to be arranged alphabetically)
e.g. UWB2	Barbers. Haircutting
UWB4	Beauty-parlours. Hairdressing
UWB7	Bottle industry
UWC9	Cutlery
UWD7	Doors
UWG3	Gasoline-supply station
UWL7	Locks and keys
UX	Household and home.

Except by enumeration, the difference between US, UT, UV and UW is not obvious. We may take all the four to give a single schedule. But, it is difficult to see the difference between USY, UTY and UW. The common English name is prescribed as the basis of alphabetical device in all these cases. The examples show the precariousness, apart from being inapplicable for universal use.

67 CC

The schedule of CC is as follows:-

M1	Book production
M2	Journalism
M3	Domestic science
M4	Smithy
M5	Carpentry
M6	Glass industry
M7	Textiles
M8	Dress making
M92	Masonry
M95	Photography
M97	Leather industry

Others by Subject Device

e.g.	MB1	Calculating machine
	MC3	Gramophone
	MD12	Clay industry
	MJ7	Ropemaking

The use of subject device gives great difficulty. Its prescription had been made hastily without realising the number of arts and crafts that can be associated with a subject. This prescription had been made even in edition 1 in 1933. The present understanding of zone analysis may be of use in reconstructing the schedule of M. M is only an artificially improvised main class. It is a hold-all main class set up to hold all the subjects in the applied field. It is only a bundle of more or less independent subjects. We can not call them strictly canonical divisions. But they have the same status. There is another consequence of "M Useful arts" being an artificial main class. There can not arise any systems or specials of it. Therefore, zone 3 of array of order 2 can not be put to the usual use. In fact, zones 2 and 3 may be taken together as the base for its divisions. By using these octaves in each of the zones 2 and 3, we get 84 places in array of order 2. But the number of subjects goes to many thousands. Therefore, most of these 84 places should be allotted only to groups of related subjects, of course, subjects backed by great literary warrant may each be given a place all by itself. It may be convenient to reserve zone 2 for specific subjects with great literary warrant. 24 is the maximum number of such subjects to be singled out. If necessary, a few of these 24 places may also be assigned to groups.

68 Group Notation

It will be inconvenient to have more than three Roman capitals together. Therefore, the last octave in zone 3 may have to be occupied by two-digited numbers. Thus 400 groups can be accommodated in it. The groups with comparatively greater literary warrant may be placed here. Another 400 groups with less literary warrant may perhaps be placed in the penultimate octave of zone 3. The octave preceding the penultimate octave will have two 9's before the significant digit is reached. Therefore, convenience will indicate the placing of 20 groups only in it. Thus, we can provide places for 820 groups of subjects in zone 3. The digit after the group number should represent a specific subject. The digit will be an Arabic numeral. Thus 6,560 specific subjects can be accommodated in zone 3. If not, we may use more than one octave, or perhaps even use groups of two or three Arabic numerals for the subdivision of each group formed with two letters. The former will give 19,680 places. The latter will give 419,840 places. But then the basic subject number itself will have 6 digits, 7 digits, and 8 digits in the respective octaves. This may be inconvenient. For, the facets will have to come after these digits. Perhaps, a compromise will be to so arrange that the number of digits in the basic class number decreases inversely to the literary warrant. The first step to settle these issues is to make a list of all the basic subjects of this kind, which are known and which have some literary warrant to-day.

681 Need for List of Arts and Crafts

Such a list has not yet been done. It is wanted also in the classification of the industries, in Economics. The late T.M. Koranne of the Delhi University Library started making such a list in 1952. He based his work on the new edition of the Dictionery of economic products being compiled by the Council of Scientific and Industrial Research of India. But alas, he passed away before making much progress. A list of commodities has been found necessary in two administrative schemes also viz., trade statistics and customs work. Therefore, a list has been attempted by administrators quite independently of the profession of librarians. The League of Nations has prepared such a list before World War II. The United Nations brought out a revised version in 1951 with the title "Standard international trade classification". It also brought out in 1952 "Commodity indexes" for the above. Another similar list was published in 1948 by the Central Statistical Office of Great Britain under the title "Standard industrial classification". Each of these lists does attempt a grouping of industries according to the commodities and services involved. These include also the 6 subjects mentioned in section 61. I wish an aspirant for Doctorate in Library Science prepares a fairly exhaustive list of services and arts and crafts. Such a list will suggest various characteristics on the basis of which they can be grouped. It will then be possible to pick out the most relevant of these characteristics for use as the basis for the formation of groups of order 1 and of order 2 respectively. With the aid of these characteristics and in the light of literary warrant, the schedule of canonical divisions of "M Useful Arts" can be formed in a more or less helpful way.

682 Zone 4

Perhaps zone 4 also can be brought into use for some of the arts and crafts. Great judgment will be necessary in the allocation of the services, and the arts and crafts among the groups in the three last octaves of zone 3, and zone 4 and in zone 2.

7 GUIDING FACTORS

Some guiding factors may be found for the allocation of the canonical divisions to the different zones and octaves. For convenience of reference, we shall denote by "Basic Facet" the canonical class number from which the initial M is omitted. From the point of view of the formation of basic facet, the canonical divisions fall into three types.

71 Manipulative Subject

In a manipulative subject, the emphasis is on the manipulation, or the processing, or the technician's treatment of a material, e.g., carpentry, smithy and leather technology. The emphasis is not in the production of an "Ultimate Commodity" for use or consumption per se. The manipulation will often result in "Intermediate Commodity". Glass technology and Ceramics should be taken into this category, since ultimate and intermediate commodities are not easily separable. Again Textiles may have to include Spinning and Weaving, though they are separable, since they are often done by the same agency and literary warrant demands it. In a manipulative subject, the basic facet is to be formed on the basis of the material manipulated.

72 Commodity Subject

In a commodity-subject, the emphasis is on the ultimate commodity produced, e.g., Food, Furniture, Container. Several materials may go into the making of a commodity. Some of these may be an intermediate commodity. Assemblage and integration will be the essential problems. The basic facet is to be formed on the basis of the commodity produced. The array of order 1 in basic facet will be based on utility, as the above examples imply. The array of order 2 also may have to be based on utility e.g. Cot, Bottle. The array of order 3 may fix a commodity.

73 Service Subject

Other arts and crafts may give a service and not a commodity, e.g., Laundry, Barber's Work, Garage Service. These will have to be enumerated from the very start, without perhaps formation of arrays on the basis of characteristics.

74 Evolutionary Sequence

The Canon of Evolutionary Sequence would suggest the giving of precedence to manipulative subjects over commodity-subjects. Perhaps service-subjects may come last.

75 Numerousness

The number of commodity-subjects will be much greater than that of manipulative subjects. The number of service-subjects is now smaller than either of the above. It may perhaps be always so.

8 ALLOCATION

The above factors suggest the allocation of the different types of subjects to zones and octaves in the following way:-

Manipulative subjects:- zone 2, subject to the demands of literary warrant to have any subject of the other two types placed in this zone, and also subject to any of the manipulative subjects in excess of the capacity of zone 2 and with less of literary warrant being placed in the penultimate octave of zone 3.

Commodity-subjects: zone 3
Service-subjects : zone 4

81 Zones 2 and 3

If we take literary warrant and numerousness of the subjects of different types into consideration, the above allocation will give overall satisfaction to the Law of Parsimony. Helpful sequence has to be found for the enumeration of the foci in each of the arrays of the basic facets in the canonical divisions of zones 2 and 3.

82 Zone 4

It is not yet clear how the enumeration should be made in zone 4. Normally, zone 4 is formed by subject device. It is doubtful if subject device will be of much help in this case. We saw, in the preceding article of this series, that it is not directly applicable in array of order 1 - that is array of main classes. But, we used it obliquely. Perhaps, the same may hold good also in array of order 2 having the main class M as the immediate universe.

DEPTH CLASSIFICATION

16. PACKET NOTATION

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Shows instances where homonyms occur in the use of Subject Device in CC as well as UDC. Examines the applicability of Packet Notation for eliminating homonyms of this type. Isolates some problems for further study.

1 INTRODUCTION

With the present notational set up in both CC and UDC, the use of Subject Device gives rise to homonyms in some instances. In the case of CC, this is due to the provision for using multifaceted Subject Device among facets of a main class. It becomes difficult to distinguish whether the later facets are part of the Subject Device or belong to the primary Main Class. The use of Common Subdivisions also gives rise to the same difficulty. In the case of UDC, which does not provide for facet analysis, the homonyms arise only in the use of Common Subdivisions along with a coloned class number. Again, in the application of Phase Relations in CC we come across similar instances of homonyms.

11 Examples

Let us consider the following specific subjects:

Teaching technique for medicine in India
Teaching technique for Indian medicine

With the present notational set up in CC, we get the same class number T:3, L.44 for both these specific subjects. This class number is therefore homonymous.

Again let us consider the UDC number for these two subjects. We get the same class number 37:61(54). The UDC class number is also homonymous.

2 PACKET NOTATION

In order to remove this, Ranganathan has suggested in his fifth report to FID on general theory of classification (FID document No F55-37) the use of "Packet Notation". i.e. to enclose the subject device part of a class number within brackets. He has also illustrated the use of this Device in his article "Depth classification 13" published in "An lib sc 2, 1955, 79."

21 Ordinal Value

In order to secure a helpful sequence, the ordinal value of brackets was postulated to lie between z and 1.

However the ordinal value of the second bracket is not fixed. "The relative ordinal values of two packeted numbers are determined by those of the numbers within the respective bracket."

3 LAW OF PARSIMONY

Though the Packet Notation resolves the homonym wherever it arises in the application of Subject Device, it has to be applied even in cases not giving rise to homonyms. In other words, it has to be used in all cases where Subject Device is used. It would mean addition of two extra digits in using Subject Device. This throws a challenge to Notation.

31 Arrester Symbol

In the use of Subject Device the conflict does not normally arise at the point where the Device is applied. In most cases the starting point can be easily distinguished. There is no need for introducing a symbol at this point. However, there is no significant demarcation to show the end point of Subject Device. This is the region of conflict. Homonyms arise mostly due to this. In order to resolve this, an "Arrester" symbol may be used to indicate the end point of Subject Device. This enables us to save already one digit in all cases of Subject Device.

32 Ordinal Value

The fixing of the ordinal value for the "Arrester" symbol between 0 and "." secures generally the same helpful sequence as "Packet Notation".

Packet Notation	Arrester Symbol	
T : 3,[L$\underline{a}$]	T : 3, L$\underline{a}$	Teaching technique for bibliography of medicine
T : 3,[L]	T : 3, L	Teaching technique for medicine
T : 3,[L]. 44	T : 3, L].44	Teaching technique for medicine in India
T : 3,[L.44]	T : 3, L.44	Teaching technique for Indian medicine
T : 3,[LA]	T : 3, LA	Teaching technique for Ayurveda

In the above examples, for "Packet Notation" both the brackets will have to be used in all cases of Subject Device irrespective of the existence of homonyms or not. This violates the Law of Parsimony. On the other hand, the "Arrester" symbol is used only when the facets following a "Subject Device Class Number" belong to the primary Main Class. That is wherever there is no conflict, the "Arrester" symbol need not be used. This is a neat solution for removing homonyms arising in the application of Subject Device.

33 U.D.C.

In the case of UDC a semi-colon is suggested as a "Arrester" symbol for removing homonyms arising in the application of Subject Device. It is also suggested that the ordinal value of this symbol should be between "=" and "(0)".

34 Recommendation of FID/CA

At a recent meeting of FID/CA, the use of Arrester Digit "]" was suggested for consideration by the FID/CC.

4 PROBLEMS
TO BE SOLVED

41 Anteriorising C.S.

However in CC, we meet with some difficulty in cases where Anteriorising Common Subdivisions are applied after Subject Device:

T : 3, L$\underline{v}$	Teaching technique for history of medicine
T : 3, L	Teaching technique for medicine.
T : 3, L] $\underline{v}$	History of teaching technique for medicine.

According to "Packet Notation", the helpful sequence is as follows:

$T:3,[L\underline{v}]$	Teaching technique for history of medicine
$T:3,[L]\underline{v}$	History of teaching technique for medicine
$T:3,[L]$	Teaching technique for medicine.

We could secure the same sequence as the "Packet Notation", if we give the "Arrester" symbol another ordinal value in cases where it is immediately followed by an Anteriorising Common Subdivision. In such cases, the "Arrester" symbol should have an anteriorising property and its ordinal value should lie between $\underline{x}$ and 0. Then we have

$T:3,\ L\underline{v}$
$T:3,\ L]\underline{v}$
$T:3,\ L$

This is the same as in the "Packet Notation".

However to provide a symbol with two ordinal values depending upon what follows it, is not appropriate. A neater solution should be found. This is a problem to be solved.

42 Chain Procedure

The deriving of subject headings by Chain Procedure for the specific subjects illustrated above also present some problem. Though the homonyms are resolved in the class numbers by means of Packet Notation, they still present a problem in the construction of subject headings. The following class numbers

$T:3,\ [L\underline{v}]$
$T:3,\ [L]\underline{v}$

will both get "HISTORY. MEDICINE. TEACHING TECHNIQUE".

Mere juxta-position of terms alone does not represent exactly the specific subjects. A solution should be found for removing this homonym. This is another problem to be solved. Perhaps the introduction of brackets in the case of headings also may remove this fault.

IFLA WORKING GROUP ON CATALOGUING

S. R. RANGANATHAN

Makes a critical study of the sections on corporate author heading found in the Interim Report on the Francis Committee. Points out the consequences of the failure to start with a provisional definition of the chief concepts and terms. Shows the patchiness, and the omission of many important problems in the "Points for further study".

1 INTRODUCTION

At its meeting in Zagreb in September 1954, Ifla set up its Working Group on the Co-ordination of Cataloguing Principles and asked it to report on Corporate Author Heading and on Heading for Anonymous Work, at the Brussels meeting in September 1955. For shortness, the group will be called Francis Committee after the name of its Chairman. An "Interim report" was released in time for the Brussels meeting. Part IIA gives the analysis and Part IIIA gives the conclusions on Corporate Author Heading. This paper is on the sections of the latter part.

2 DEFINITION

IIIA1 "Any Government or organ of Government, or any corporation, institution, association, and any meeting or assembly of persons may be a corporate author provided that it is known by a distinguishing name".

21 "Government". This is taken as an assumed term. It is not defined. In common usage, it does not denote a Local Body. But section III A4(b) implied its inclusion. Such a "smuggling in" of a new item in the meaning of a term without its explicit inclusion at the stage of definition is a grievous fault.

22 "Organ". This is taken as an assumed term. The failure to define it leads to a clumsy jumble of terms in III A4(c) in the phrase, "If the corporate author is an organ branch or administrative division of another body". Does this include kinds of corporate author not covered by the definition in Section 1 or is it mere tautology?

Further organ is mentioned only in the case of a Government. But it is also possible in any other kind of corporate body. In fact, this is taken into account in section III A4(c). This is an inconsistency.

23 "Corporation, institution or association". What is the need to mention all these in one breath? A careful definition of this kind of corporate body and a single term to denote it are necessary to avoid trouble in the later discussion and in the rules.

24 "Meeting or assembly". What about Conference and Congress? Here also a single defined term should be established as suggested in 23.

25 The correct course is to provide a careful definition for "Government", "Institution", and "Conference" for use in the context of cataloguing. So also "Organ" should be defined and a criterion should be set up to distinguish an organ from an independent corporate body, for cataloguing purposes. It is pestering to meet these at the stage of discussing or forming a rule on the choice or rendering a heading.

26 "Distinguishing name". This has been inserted without sufficient thought. Many an institution does not have such a name e.g., National Research Council, Library Association, General Post Office. These are authors of documents. Cataloguing practice has rules to resolve homonym. In a note to section IIA1, the report speaks of "collective or corporate name, as distinct from the names of the persons composing it" in defining corporate authorship. Why is this abandoned in Section III A1.

27 Much of this looseness is due to failure to set about the problem of definition consciously and in a scientific way and to too casual and drifting a beginning. Some of the defects are also due to slovenliness and failure to focus on the definition of all the varieties of corporate authors arising in actual work. The resulting defective and haphazard definition of the basic concept and term in the field of investigation is unfortunate in a responsible document.

21 Amplification

III A2 "For the purpose of entry in an author catalogue, a corporate author is regarded as the author of any document for the content of which it takes collective responsibility and which relates directly to its own activities eg., constitutions, regulations, minutes, reports, proceedings, manifestoes, statements of objects or policy etc; also of series whose titles include the name of corporate author".

211 The advantage of having a section on "may be author" and another section " is author" is not seen.

212 "Entry in author catalogue". What is the purpose of the restrictive epithet "author"? Will the definition of corporate author be different for an accession catalogue, classified catalogue or dictionary catalogue? Surely a corporate body being the author of a document is a fact intrinsic to the document itself and is independent of the nature of the catalogue in which it is entered, and independent even of its being catalogued at all.

213 " A corporate author is regarded as the author of any document". Except in relation to a document there can be no corporate or personal author. Perhaps "corporate body" is meant. This is a bad copying of the ALA Code. It states "a corporate body may be regarded as the author of publications etc.".

214 " For which it has collective responsibility". What does "collective" imply? Is it that the responsibility is not that of any individual person(s) constituting the corporate body? If so,it is tautological.

215 " Which relates to its own activities policy etc." The term "its own" is a wrong restriction. When the title page of a document mentions the name of a person in the author-statement and also indicates the name of a corporate body to which he belongs, the above-mentioned restriction is used to distinguish between personal and corporate authorship. But it is open to one corporate body to produce a document on some other corporate body. Thus, the above restriction has been inserted out of context having been taken from some other documents, code or book.

216 " Also of series whose titles include the name of the corporate author". The meaning of this is beyond comprehension.

217 Even when read together, Sections III A1 and III A2 fail to function as a satisfactory definition. This cannot be played with in this way. A long series of concepts and terms should be defined, before "corporate author" can be defined. A long chain of definitions will have to culminate on the definition of this term. In my "Heading and canons: comparative study of five catalogue codes" (1955, April), the chain of definitions covers successively Thought, Work, Corporate body, Organ of Corporate Body, Author of Work,

Personal Author, and finally Corporate Author. Backed by the first six definitions as preliminaries, the definition of Corporate Author is given in section 2232 as "Corporate body as author, the responsibility for the thought and expression in the work resting solely on it and not on personal author(s)". No doubt, we can combine all the six definitions into a single one. But it will be clumsy. It will violate an essential principle in drafting viz. the principle of unity in thought as well as expression. It will also be difficult to apply. It will be bad in every way.

3 Rendering of Name

III A4 "The heading for any corporate author is the official name or title of corporate author, except that" (five exceptions are mentioned viz.)

(a) shorter or more familiar name, in certain case;
(b) name of geographical unit, in case of Government;
(c) and (d) name of parent body followed by Organ in certain cases; and
(e) name of the corporate author, if a corporate author as a whole is responsible, even though composed or issued by an organ).

31 "Official name or title". If "title" is a synonym for "name" it is tautological. Tautology serves no purpose in a technical or scientific document.

32 The definition of "corporate author" has been disposed of in Section III A1 to 3. But exception (e) again refers it up and adds to it, in a section on rendering of name. This is bad.

33. "Issued by an organ". In section II A 3(a) dealing with analysis, the problem" Authorship or publications" had been correctly decided. The right place for the incorporation of the decision is the section on definition and not the one on the rendering of name.

34 The exceptions in section III A4 are many times more formidable than the basic rule. Elegance in drafting requires that this should be stated as a number of distinct prescriptions. It will make application also easier.

35 Fundamentally, the above uncouth section is due to clarification not having been made about the different kinds of corporate bodies and about the decision whether the authorship of a document rests with a parent body or an organ of it, at the stage of defining these terms and concepts.

4 Patchy Presentation

At the end of Part III A, "Points requiring further study" are enumerated. Only four points are enumerated. The fourth point raises the question of "Responsibility for thought content viz. Responsibility for issue". This is answered by the definition of "corporate author" in section III A2.

42 The list is too patchy. It has omitted some very important points requiring further study. These are the following:-

421 The determination whether the corporate author of a document should be rendered as if it were an independent corporate body or as if it were an organ of another corporate body. There is no uniformity in the prescription on this point by the different catalogue codes. Nor is the prescription of some of the codes clear and easily applicable. There is first the issue "Government or Institution". This issue becomes difficult since nowadays a Government assumes an increasing number of functions which were in the private sector in the past. Some functions are discharged departmentally. Some are entrusted to autonomous institutions created by legislation or executive order. There are all grades of transition between these two extremes. There is a similar problem in ecclesiastical polity also. This problem appears again as Institution vs. Institution. This presents complications when the parent body is a University or a National Academy as the one in Moscow. It looks as if there can be no simple formula to solve this problem. Solution by enumeration has been suggested as the only course in section 2288 of my "Heading and canons".

422 Resolution of homonym in the name of a Government, of an Administrative organ of a Government, and of an Institution. Elaborate rules on the resolution of the first two kinds of

homonyms are given in the Indian Codes - my Classified catalogue code and Dictionary catalogue code. The Vatican code and the ALA code also have rules on the resolution of the first kind of homonym; but they are not sufficiently full on the second kind. The modern tendency to give special weight to the micro documents produced by Government bodies makes this issue important. International documentation will suffer unless the rules in the various codes on this problem are co-ordinated and strengthened.

423 Inversion of the words in the name of an organ so as to make the word denoting the sphere of action of the Organ the entry word used in the subheading contributed by the Organ. The words like Board, Bureau, Department, Division and Ministry occurring in the name of an Organ have little potency. Nor are they "sought" words. Nor are such words "permanent". Nor are they correctly remembered. And yet in some languages, these important words occur at the beginning of the names of Organs. As Organs of Governments are becoming prolific authors in modern times, an impotent entry word will be a great barrier to the effectiveness of the catalogue. Therefore, there should be an agreed prescription on this problem.

424 Determination of the main heading for a document of the delegation sent by one corporate body to another, particularly, to a Conference. Three corporate bodies are involved. The Delegation is the author. It has an amphibious existence in relation to the other two corporate bodies. It has to choose one of them as the main heading. Here the codes do not agree. Some codes do not conform to the basic definitions with which they had started. Readers themselves are not able to make up their mind as to where they should expect the concerned documents. This is an important problem on which Francis Committee should arrive at some co-ordination.

5 POOR REPORT

The "Interim report" is a poor production for reasons of the meagreness of the ground covered, superficiality, lack of clarity, bad drafting and ineffectiveness in capacity for communication. The communication was difficult even when the members met face to face and considered it sitting at a round table. Unawareness of all the difficulties besetting the concept, choice, and rendering of corporate author headings and unfamiliarity with important regions of the existing literature on the problem are disclosed by the report.

6 WHY HASTE

And yet there was too much reluctance and impatience to set about rectifying the defects in a systematic and thorough manner, based on the scientific method of clarifying terminology and establishing equivalence among the terms used by different codes, formulating some agreed guiding principles as a basis for spotting out and stating the differences among codes in terms of objectives and internal consistency, and isolating all the problems involving idealogical differences. A sense of haste was visible. It was alleged that there was no time to improve the report fundamentally. According to a contract with Unesco, the report should be submitted to it in some shape or another by November next. Time was allowed to lapse for eight months in the year. The "Interim report" bears no date. But it could not have been drafted before June. For my "Heading and canons" figures in it organically. This was published in Madras only in April and copies did not reach Europe till June. If time had been lost heavily for one reason or other, the proper course is to ask for extension of time and not to nominally fulfil the contract with a poor and incomplete report.

7 GRIEVOUS OMISSION

The list of catalogue codes forming the basis of investigation is given in section 16 It includes 18 codes. All of them are of the West. Codes of the East are severely avoided. Ignorance of the latter cannot be pleaded. The two codes of India, published by the Madras Library Association, have been in the field for a long time. The "Classified catalogue code" dates from 1934.

It is in the third edition. "Dictionary catalogue code" is in the second edition. Many copies are available in England including the British Museum Library. The omission of these two Indian codes becomes grievous if it is remembered that the Zagreb Meeting of the Ifla gave a specific direction to the Francis Committee that these should be included among the codes to be used in its work.

8 HOPE

It is hoped that this serious mistake will be rectified in a proper manner in the redraft of the report before it is sent to Unesco. It is also hoped that the problem of further investigation will be enumerated more fully in the re-draft. It is further hoped that the quality of the re-draft will be characterised by greater clarity and capacity to form an effective medium for communication. No doubt, it is good for Unesco to enforce a time table. But it is equally essential that the report is of proper standard, that it is not partial to the Western School of thought, that it does not exclude any Eastern School of thought and particularly the Indian Codes which it was asked to include and that it is more complete and not a mere make-believe. Between accepting a poor, incomplete and superficial report and giving extension of time for the production of a proper report, it is expected that Unesco will prefer the latter. Surely, Unesco should be really interested in substance and not in ritual.

DOCUMENTATION IN MANY LANDS *

2. EVOLUTION

S. R. RANGANATHAN

Analyses library service into five kinds. Examines the need of each kind in the sphere of classification, cataloguing and reference service. Points out the incidence of each kind of service in each of three types of libraries. Traces the evolution of business libraries and of the different kinds of documentation lists. Brings out the post-war development of anticipatory documentation list and of the establishment of National Documentation Centres for the purpose.

0 TERMINOLOGY

The terminology established in "Documentation in Many Lands 1" is used.

1 KINDS OF LIBRARY SERVICE

Library service is not homogeneous. Law 1 "Books are for use" and Law 4 "Save the time of the reader" emphasise only its general attributes. But Law 2 "Every reader his book" and Law 3 "Every book its reader" imply that at its ultimate stage, library service will have to be severely individual. To be more precise, the choice of the documents needed by a reader will have to be made individually on each occasion. It will have to be done by the reader himself. Then, what is the work of the library staff?

11 Gardener Analogy

Its work is comparable only to that of a gardener. He can only bring the manure and the water to the plant. It is only the plant that has to select and absorb the specific ingredients in the right quantity and proportion. Of course, a technically qualified and alert gardener will be different from an ignorant and indolent gardener. The latter will dump in any general manure without reference to the contents of the soil or to the specific needs of the plant. He will also fail to regulate the quantity of water supplied. The plant may have to spread its roots wide and spend its energy in other ways to get the correct quantity and proportion of the ingredients and perhaps even to extract some of them from a conglomerate of wanted and unwanted stuff. But the former will regulate these with knowledge and care, and thus lessen the strain on the plant.

12 Restriction of Region for Search

So it is with the work of librarian. An ignorant and indolent librarian will arrange his books and periodicals in the sequence in which they reach the library and leave it to the reade to find out what he wants. The universe of knowledge and the universe of documents are so vast

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* Continued from *An lib sc* 2, 1955, 28.

for Law 4 to be satisfied if the reader is turned on the whole collection of a library. A technically qualified, alert and industrious librarian will mark out for a reader just that region of the universe of knowledge and the collection of documents, that is rich in the literature needed by him at the moment. It is for this purpose that the library classified, catalogues and does reference service. All these taken together becomes documentation, if the emphasis is on nascent micro thought and on specialising expert reader. Restriction of the region of knowledge and of documents presented to the reader to select from and absorb to suit individual needs is of the essence of library service. The more rich the region presented is in what exactly is needed, the more efficient is library service. Richness increases with restriction.

13 Nature of Restriction

The nature of restriction needed distinguishes the kinds of library service. Five kinds of library service may be recognised:-

1 Light reading: Serving a non-specialising general reader with non-exacting, non-depressing reading material - books or magazines - as a means of recreative occupation for leisure time.

2 Ready reference: Serving a reader with ready reference books from which he can readily find specific information or facts.

3 Enlightening reading: Serving a reader with books embodying micro thought and expounding it in an easy popular style from which he can add to his general knowledge and get enlightenment. Even a specialist in one subject will need this service in the other subjects. Popular magazines too will have to be served.

4 Advanced study: Serving a reader with books and periodicals needed for the advancement of knowledge in the subject in which he specialises. The reader may be a regular student in a formal educational institution or not, or he may be an adult eager to pursue advanced study.

5 Documentation: Serving a specialist reader engaged in research, business, administration, or deliberation within a narrow region of micro thought, with the documents more or less relevant to his pursuit, aiming at exhaustiveness and expeditiousness and with emphasis on nascent thought. The attributes "micro thought" and "nascent thought" point to the need for analysing learned and technical periodicals and bringing to attention just the articles with the greatest probability for relevence.

2 ESSENTIAL DIFFERENCE

The essential difference between the five kinds of library service is in the extent of preliminary selection made by the library staff in the reading materials offered to the reader. The difference pervades also the class numbers co-extensive with thought-content of the reading materials included in the selection. It is also reflected in the catalogue or the bibliography in the extent of subject analyticals or cross reference entries.

21 Light Reading

In service for light reading, fiction, travel and biography figure most. These do not admit of any great depth in classification. They are usually arranged alphabetically within the class number concerned. Nor is it usual for catalogues to include subject or author analyticals. The popular magazines too are served as wholes. Their articles are not classified and catalogued.

22 Ready Reference

In ready reference service, the ready reference books are served, as wholes. Of course, these books have themselves analyzed and atomised the information embodied. The library staff has only to supplement these occasionally from other books and periodicals. This service concerns only facts to be found out and not knowledge to be built up. Reference service is necessary to help the reader in feeling his way through reference books.

23 Enlightening Reading

In service for general reading for enlightenments preliminary selection and sorting out has to be extensive. In the first place, the books admit of more detailed classification. But they are too general to admit of depth classification. There is not much need for subject or author analyticals. Periodicals too need not be analysed. What is specially needed is selection by standard, style and flair to match with the standard and the capacity of the reader. As stated in "Library classification: Fundamentals and procedure" (1944) of Ranganathan, neither classification nor cataloguing help in this matter. Only personal reference service can do this.

24 Advanced Study

In service for advanced study, the conditions are similar to those in service for enlightening reading. The books may admit of slightly more detailed classification. Subject analyticals may be needed to some extent. Learned periodicals will figure in this as wholes only. There is generally no need for analysing them into articles.

25 Documentation

In documentation service, the preliminary selection should be done more thoroughly, only short of pin-pointing. Pin-pointing just a few documents is neither possible nor wise. For, it is impossible for the librarian to know the needs of the reader with the necessary precision. Perhaps, it is not sufficiently precise even in the mind of the specialist reader, until he surveys the documents roughly. However, the librarian and the reader know enough for the former to narrow down the region of knowledge to be covered, so as to confine it to a few items of micro thought. It is further restricted by the period of production of the literature to be selected. It is usually nascent micro thought embodied in articles in periodicals and pamphlets and technical reports. Naturally, periodicals have to be analysed. The articles admit of depth classification. The subject headings for class index entries give trouble in cataloguing. Chain procedure has not yet been made fit for handling them. The reader being a specialist, reference service proper is not difficult, if the documentation work has been properly done. Otherwise, it will be merely a matter of hit or miss. To increase the chance for "hitting", mature specialists are "retained" as research consultants in the Library of Congress. "Reference service and bibliography" (1940) of Ranganathan prescribes "searching even the brains of living experts" to make up for deficiency in documentation.

3 TYPES OF LIBRARIES

The proportion in which the five kinds of service as practised varies with the type of library. Three types of libraries may be recognised:- Public, Academic and Business.

31 Public Library

Public library began, in the first instance, mainly for light reading and some enlightening reading as leisure-time occupation. Even now the former dominates. Every effort is being made to increase the latter. About 50 years ago, ready reference service came to be offered as an essential part of its service. Service of advanced study is not totally absent.

Most popular libraries do not practice documentation. But, during recent years some have begun to practice it, especially those in industrial centres. For example the John Crerar Library of Chicago has prepared nearly 1,000 documentation lists for specific industries. Its Bureau for Information Service is really active. It is now common for public libraries in USA to get money from business bodies to maintain such a Bureau and acquire specialised documents. For example, the Cleveland Public Library is helped by the Cleveland Shippers' Co.to acquire documents and do documentation in Traffic Management. Public libraries in Great Britain, such as Edinburgh, Leeds and Sheffield are forming departmental collections to facilitate documentation. Departments of Engineering, Technology, Fine Arts and Commerce are commonly formed.

32 Academic Library

In an academic library, light reading is not much in vogue. Service for advanced study is dominant. But documentation is not widely practised. It has not been begun in India. But some University Libraries in U.S.A. do documentation in certain subjects such as Agriculture, Economics, Technology and Public Relations. Learned bodies in India have not yet begun documentation. But many in U.S.A. do documentation.

33 Business Library

It is in business library that the demand for documentation originated. By about the beginning of the present century, a sufficient number of business libraries had come into existence and begun documentation in U.S.A. It lead to the formation of the Special Libraries Association. Today the number of business libraries doing documentation exceeds 2,000. A similar development had taken place in Great Britain. Its Aslib was established about 30 years ago. Many of the industrial houses in Europe have house libraries or a joint business library for documentation. Commercial houses were the next to have libraries doing similar work. Then came in succession newspaper offices, government departments and parliaments providing facilities for their libraries to do documentation. In India, Tisco at Jamshedpur has established its own house library. The textile industries have a common library at the Atira. Many of the Ministries and Departments of the Government of India have, of late, formed libraries of their own. The libraries of Atira and Ministry of Labour alone do continuing anticipatory documentation. The others are supposed to do documentation on demand. But it is poor in quantity and quality. This is the result of (1) Low research pressure on the other side of the counter and (2) inadequate professional training and pioneering spirit inside the counter. But there is every chance for both these factors to improve as we progress further in the ascending phase of the current cycle of our renascence. This is also true of most of the newly awakening Asian and African countries.

4 INTERNATIONAL ABSTRACTING PERIODICAL

The first form of documentation list to come into existence was the Abstracting Periodical intended to have world coverage. This took shape even early in the nineteenth century. The "Chem Centr-Blat" was one of the earliest, if not the first, of this kind. This kind was brought into vogue by the demands of scientific and industrial research. Before World War II, there were about 300 of them covering a more or less equal number of regions of knowledge. Now, their number has exceeded 1,000.

5 LOCAL DOCUMENTATION LIST ON DEMAND

After World War I, the great increase in the number of periodicals, and the intensification and speeding up of research high-lighted the time-lag inevitable in international abstracting periodicals. These had therefore to be supplemented by Local Documentation List on demand. World War II proved to be a war of brains. There was superacceleration of research in science and its application. Research had to be done by large teams of workers comprising of persons drawn from various intellectual layers extending even below the first quartile and certainly below the top centiles. The findings of every section of the team had to be fed quickly into the further work of every other section. The invention of making artificial quartz crystal, the development of radar and the phenomenal progress in atomic physics are examples of the achievements of team-research under war-pressure. The organisation of the work in such a team brought about, necessarily, the separation of a section for literature search, that is documentation. It could no longer be self-documentation and dependence on internal memory. Every advance in every micro region of knowledge had to be analysed and put into externalised memory, that is into documentation list. The documentation sections of the Pentagon, of the Navy and of the Atomic Research Station demonstrated the utility of Local Documentation List. Under the hyper-pressure of war, the preparation of it on demand could not be distinguished from the anticipatory one.

6 ANTICIPATORY LOCAL DOCUMENTATION LIST

With the ending of the war, the pressure on research tended towards normal. Even in defence science, much decentralisation came into research. However, work by large heterogeneous teams has come to stay. Individual industries also realised the value of research by large teams. They also saw the value of local documentation lists in preventing the consequences of the time-lag in international abstracting periodicals. They found it worthwhile to maintain a documentation section to analyse the periodicals taken in the library and to feed the workers with nascent micro thought. But poring through the diverse periodicals to find out relevant micro thought, each time a research worker needed information, involved two defects. In the first place, there was again much of time-lag involved in the process of searching through the pages of periodicals. There was also wastage of documentation man-power, in the same periodicals being scanned from end to end on each occasion. No doubt internal memory got enriched gradually and the time of search diminished. But, it did not take long to discover that a more efficient method would be to analyse each periodical on arrival, pick out every item of micro thought likely to be relevant to the work in progress within the industry, and put each of it into externalised memory, brought out as an anticipatory local documentation list, on daily, weekly, or fortnightly or monthly basis depending on the quantity involved and the speed of research.

61 Organisation of Entries

The purpose of such an anticipatory local documentation list is again the same viz to restrict the range within which alone search need be made when the demand comes. Even local time-lag is eliminated by this. The play of the probability of "hit or miss" gives place to certainty of exhaustiveness. Throwing the contents of the external memory i e the documentation list, in a minutely classified apupa pattern would give the best result. But, the library profession - or to be more strict the documentation profession - in the highly industrialised countries had not yet equipped itself with the necessary technique of phase, facet, and zone analysis to use a severely analytico-synthetic scheme of classification to organise the entries in the list in a truly efficient way. They used only alphabetical organisation by subject headings with all the loss in efficiency at the time of service. But history repeats itself again. Resistance to the development of analytico-synthetic depth-classification providing autonomy to classifiers, offered by the old guards in documentation is no less than the resistance to documentation itself offered a few decades ago by the old guards in library service. But FID is struggling valiantly against such resistance. Two items in its document F55-43 of 30 June 1955 setting forth the programme of its work needing financial help from Unesco are a good augury. They are "4 Classification and codification - a comprehensive study of the most widely used classification systems, their codification and recodification for selection purposes. 6 Fellowship for the study of the current approach to classification with particular reference to facet analysis".

7 ANTICIPATORY NATIONAL DOCUMENTATION LIST

The concept of anticipatory national documentation list to overcome the time-lag of international abstracting periodical had its beginning only in the current decade. Its evolution has been the result of the needs of newly developing or industrialising countries. Several factors make it useful. In the first place, the newly formed industrial and commercial houses do not have the means to take a sufficiently large percentage of the periodicals falling within their field either wholly or partially or remotely. They have to pool their resources together. Secondly, they do not have the finance to maintain an independent documentation staff. Thirdly, they have not yet developed the urge or the stamina to venture forging new industrial processes; they only adopt largely processes stabilised in the countries industrialised very much earlier; therefore, their mind does not think of having a research wing; hence, the question of documentation does not arise. Fourthly, the number of research workers and of routine workers in the industries is still small; thus the abler, self-helping type of men are found to form a high proportion among them; hence, the hardship due to absence of documentation is not felt. Fifthly, the personnel needed for documentation work is not available; the University of Delhi was the only place where suitable training was given; on the whole supply and demand have been at such a low ebb that much progress could not be made.

71 Government's Interest

But in the countries under consideration, the governments are actively and even directly promoting industrialisation after getting their political freedom. As a concomitant of the renascence such countries are also throwing forth a few forward thinking and re-thinking persons. As a result, the policy of creating the supply first and thereby inducing demand is being followed in many spheres of activity. No doubt, this is not easy of achievement. Many difficulties born of ignorance, inertia, or of predatoriness on the part of some clever but anti-social beings have to be overcome. And they are being overcome slowly. A few of the newly industrialising and developing countries have overcome the difficulties in the sphere of documentation and have established National Documentation Centres for the production of continuing, anticipatory documentation lists, even as a means of gently inducing the scientific and industrial workers to develop active interest in the nascent micro thought being produced in their respective fields of interest, all over the world. Such national documentation centres are sponsored by the governments of the countries. They are also financed mostly from public funds. The sale-proceeds of the national documentation lists can not cover even a fraction of the cost of production.

72 Appetiser

The government-financed service by national documentation centre has really to be evaluated as an appetiser for a few years. If any charge is made for the service, it can only be nominal. If it is fixed on a commercial basis, the shyness of the consumer can not be dissolved. Demand can not be fostered. The progress of research will be meagre. The rate of industrialisation and of the improvement of standard of life and national income will continue to be small. Therefore, the national documentation centres will have to be continued on appetiser basis as a public project for some years, before the volume of demand can reach a level admitting its being put on a self-supporting commercial basis. The experience of the few countries which have established such national documentation centres is encouraging. It has brought to light a hitherto unexpressed want. The steady rise in the number of users proves this. If the first staff of the national documentation centres is fortunately recruited from persons with a pioneering, patriotic, and industrious way of life, we can expect much benefit.

DOCUMENTATION IN MANY LANDS

3. EUROPE*

P. SHEEL
Insdoc, New Delhi

Gives a general outline of the organisation and working of scientific and technical documentation centres in several European countries. Brings out some special features and differences in techniques employed in the various centres. Examines some aspects of the application of automatic devices like punched-cards, Cordonnier cards, photoelectric devices for documentation and use of classification for these devices. Suggests active co-operation between national organisations for reducing the time lag in scientific reporting.

1 INTRODUCTION

The author had an opportunity to visit last year a number of national scientific documentation centres, and other specialised organisations who have arranged documentation facilities, in several European countries. This note summarises his experiences during that visit.

Besides an acute awareness of the importance of documentation and its rapid dissemination over the relatively short distances occurring in most European countries, the multiplicity of specialised libraries, and excellent communications appeared to the writer to be among the major factors which have contributed to the development of documentation facilities in European countries to the present high standards.

2 NATIONAL DOCUMENTATION CENTRES

The national scientific documentation centres, such as the Centre du Documentation du Centre National de la Recherche Scientifique, or the Yougoslav Centre for Technical and Scientific Documentation, Belgrade, offer on payment all the normal documentation services. They receive a large number of requests for copies of documents. Such institutions therefore have taken steps to build up their own libraries and have installed equipment for microfilming, photostating or other document copying methods. They also record information about the holdings of the local scientific libraries, or compile the union catalogues of their countries. These reference aids are most useful to them for supplying information rapidly. Both of these national centres publish abstracting bulletins in their national language. Arrangements are also made to provide, on request, translations of scientific articles from other languages. An index of such translations is maintained at the documentation centre.

21 Yugoslavia

The Yugoslav Centre for Technical and Scientific Documentation at Belgrade has started a new experiment, namely that of fostering the growth of regional documentation units in selected industrial concerns to cover the needs of a particular group of industry. This experiment in co-operative documentation is an interesting development, specially when viewed against the special conditions now prevailing in that country. A number of such regional units are already functioning.

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*Acknowledgement with thanks is made to the Editors of Nachrichten fur Dokumentation for permission to publish here the English version of my article entitled 'Dokumentation in Europa - Eindrucke eines indischen Dokumentalisten - published in Jahrgang 6, Heft 2, Juni, 1955.

✓22 Scandinavian Countries

The Scandanavian countries do not have National scientific documentation centres. Here the functions of a national centre are carried out by the technical libraries, such as the Denmark Technical Library, Copenhagen, the Tekniska Høgskola Bibliotek, Stockholm, and the Royal Norwegian University Library, Oslo. These libraries receive a copy of all national scientific and technical publications, either under copyright law or by co-operative arragements. The libraries co-operate between themselves in the publication of periodical indexes in special fields, giving indications of availability in the Scandanivian libraries. Information is thus available about the holdings of all libraries in the region, and inter-library loans are well organised. Apart from supplying photostat and microfilm services, these libraries provide continuous documentation services for selected industries. Standard library cards, 75 mm x 125 mm, carrying the bibliographic data of current scientific papers, with a short indicative abstract, and classified by U.D.C. are reproduced either by the azo process or printed by letter press and are supplied to industrial organisations on a small payment. A considerable measure of selection is exercised in the literature search and compilation of this documentation. This is related to the needs of the country and the facilities of the organisation carrying out the particular job; for example the Tekniska Hogskola Library, Stockholm, provides documentation in mechanical industries, while the library of the Technical University at Gotenberg supplies documentation on textile industry.

23 Great Britain

In Great Britain, the position is somewhat different. There the specialised libraries and information services have formed an association called Aslib, and it is this body that provides centralised information on scientific and technical matters and also supplies copies of documents. Aslib does not possess a library of its own but maintains information about holdings of the important British libraries. It does not have its own photographic laboratories either; photostat services are available from other institutions such as the Science Museum, and users in Britain generally prefer photocopies to microfilm copies. Aslib does not provide translations but recommends a suitable translator. An index of translations available in all commonwealth countries is maintained.

I observed an important difference in the day-to-day working of the document procurement work of Aslib and the Documentation Centre at Paris. Aslib insists on the enquirers filling up their orders in triplicate and uses the copies for its internal processing; while the French Centre accepts orders in the form of a single copy and makes out copies of the reference as needed for processing, thus imposing more clerical work on the staff of the Centre but sparing the customer.

The national scientific documentation centres generally make a nominal charge only for their documentation services. The low charges are in effect considered an indirect subsidy to scientific research. The only exception noticed was in case of Aslib, which tries to recover its costs

24 Netherland

The Netherlands National Documentation Centre, Nider, besides providing documentation services, also takes an active interest in the training of documentalists.

3 DOCUMENTATION IN INDUSTRIAL CONCERNS

I visited a large number of industrial concerns to study the methods of documentation followed by them. In general, industrial concerns have organised, for their internal use, very good documentation facilities. This arises from their basic necessity of keeping abreast of the new developments and refinements in manufacturing processes, which may reduce the costs of production or lead to the adoption of new or cheaper raw materials. Further, a thorough search of patent literature gives an indication of the activities of their competitors.

The general pattern followed by industrial concerns in their documentation is fairly uniform. After recording the receipt of periodicals in the library, they are scanned either by the library staff or by the library staff assisted by the technical staff. An index card is then prepared, sometimes with a short indicative abstract, and one copy is filled by subject and another by author; spare copies are made available to other departments or to sister organisations managed by or associated with the main firm. A large number of industrial concerns are using the U.D.C. Emphasis is laid on quick circulation of the data. In some industrial concerns documentation on social, economic and labour management problems is also maintained.

31 Patent Literature

The patent literature is most often looked after by a special section. The objectives of this section are: firstly to keep abreast of the literature, secondly to be able to carry out a retrospective literature search and if necessary lodge an objection to the grant of a new patent, and thirdly to help their organisation in patent work. The patents are usually classified and filed either according to the German system or by their serial number as in the case of American patents. The Netherlands Patent Office offers to classify any particular patent in accordance with U.D.C. or to supply the equivalent of the German classification, whichever is wanted. A very nominal charge is made for doing this, and a number of industrial concerns avail themselves of this service.

4 DOCUMENTATION IN RESEARCH ASSOCIATIONS

The development of research associations is a special feature of the organisation of scientific research in Great Britain. The Department of Scientific and Industrial Research has taken great interest in this direction and given financial assistance for the purpose. A number of other countries also, including India, have adopted this mode of organisation of collective or cooperative research..

Dissemination of scientific and technical information to their members is an important activity of the research associations. For this purpose some associations prepare abstracts of scientific articles, classify them, and then circulate them to members, either in a mimeographed form or as printed abstracts. Information on new instruments, techniques or raw materials for use in their industries, as well as data on patents literature, is included in this survey. Great emphasis is placed on rapid dissemination of information.

The research associations also undertake research work on problems pertaining to their field of interest and compile special project reports for their members.

5 CLASSIFICATION

I observed that a large number of institutions were classifying books and articles from periodicals according to schemes which they had themselves drawn up. The old established libraries were generally continuing the classification scheme which was in use earlier, for facilities to reclassify their holdings were not available. In a few libraries, however, the currently used schemes of classification were not found sufficiently well developed to meet their special needs and a new scheme was evolved. The libraries established in recent years have generally adopted the U.D.C.

A simplified classification guide, based on the U. D. C. for classification of literature in the Building Sciences has now been published. From discussions with documentation officers attached to a number of building research institutes, it appeared that the scientific institutions, individual scientists, and mercantile firms had liked this condensation of the U. D. C. scheme on building sciences into a simple handy form.

The users of U.D.C. felt for the most part that greater attention should be given, as a matter of some urgency, to developing a workable scheme of classification for the comparatively recent fields of scientific activity. This development work could be accepted for international co-operative purposes, and its further elaboration and detailed breakdown left to a few institutions who were actively concerned with documentation in that particular field. These institutions could develop the scheme keeping in view the rate of scientific progress in that line and the needs of the scientific community.

In view of the experience gained by the publication of the simplified classification guide for building sciences, it may be better if similar broad-based schemes of classification could be compiled for various scientific fields, new or old, revised every year and thus kept reasonably uptodate, whereas the detailed classification guide could be revised and brought up to date once in ten years or so.

6 APPLICATION OF AUTOMATIC MACHINES FOR SCIENTIFIC DOCUMENTATION

The application of automatic machines for documentation was somewhat limited in the European countries visited. In some cases the availability of the automatic machines in connection with mathematical computation work led to their use in documentation. Only a few of the institutes visited had installed machines specially for scientific documentation.

61 Punched Cards

The Bureau of Agriculture, Cambridge, maintains on punched cards complete documentation on the subject of plant breeding. Ten agricultural crops fall under their purview and a different coloured card is employed for punching data about a particular crop. Thus a visual separation is effected in the first round by filing these cards in separate indexes. The data punched on each card comprise the U. D. C. classification number, the year of publication, a serial number for the journal, its volume and page number, and the serial number of the abstract in their monthly abstracting bulletin.

The Power Samas accounting machine for punching and sorting is employed. For this institution, therefore, it becomes comparatively easy to compile a bibliography on a particular problem connected with any of these ten agricultural crops. I was told that apart from retrospective searches the machine was most useful for the purpose of compiling the annual index of the Plant Breeding Abstracts, by subject as well as author.

The Gmelin Institute is using I. B. M. machines and Hollerith type cards for indexing information on inorganic compounds. The system of classification employed has been specially developed and follows the element, not necessarily in the periodic table order. The chemical formula is written in straight lines for ease in punching. Geographical and geological data are also indexed. This arrangement enables the data to be searched from many different angles.

62 Cordonnier Cards

The principle involved in the use of these cards is well known and a number of institutions are employing this system. A search conducted on these cards yields the numbers of the references from a serially numbered index but does not lead to information about the contents of the articles.

The Documentation Centre of the Centre National de la Recherche Scientifique, Paris, is keeping complete records of the notified translations on this system. The numbers indexed are the serial number of the translation in their monthly list. The Institut des Fruits et Agrumes Coloniaux at Paris is using these cards for recording abstracts of articles of interest to them; the number indexed in the cards relates to the serial number of the abstract bulletin.

63 Edge-notched Punch Cards

The Association for the Study of Textiles, Brussels, uses edge notched punched cards for their documentation. The system of classification employed is U. D. C. and the data recorded are the U. D. C. number, a few letters of the alphabet from name of the author, a serial number corresponding to the title of a journal and year of publication, the geographical area, and also whether the reprint is available or is being obtained. Information about patents is also punched. The summary of the article is typed on the space provided in the centre of the card.

This appears to be one of the cheapest forms of maintaining documentation in a narrow specialised field without the necessity of making multiple cards for filing in different sets. With a little experience in mainipulating the sorting needles it becomes easy to locate a reference, and a selection is possible form different angles by using several needles appropriately arranged.

The Gmelin Institut is also keeping some data on edge-notched punched card. Improved devices for picking out the edge-notched cards required in a search have been designed, and a maximum of 30 needles at a time can be employed to effect a search.

64 Photo-electric Searching Devices

The Centre National de la Recherche Scientifique, Paris is developing for use in documentation an automatic machine based on photoelectric searching methods and employs a 45 mm x 70 mm microfilm sheet instead of a punched card. One half of the film sheet (35 mm x 45 mm) carries a photographic copy of the bibliographical reference and the abstract published in the Bulletin Analytique, and the other half contains photographic information of the different aspects covered by the paper in a coded form. These aspects, together with information about the journal, the year of publication, the authors' abbreviated name (total of five letters), etc. can be indicated in as many rows as required up to 20 rows, each row having space for five numerals.

The selecting machine picks out the searched-for combination of numerals irrespective of its position in any of the 20 rows. The rate of scanning is fast - 600 film sheets a minute.

Once the selection has been made by the machine, the preparation of a bibliography on microfilm becomes easy and mechanical. The film sheets are fed in the proper order into a special printing device which prints on a 35 mm film the bibliographical data and the abstracts.

A special scheme of classification covering the field of cancer research has been completed and all information on this subject is now being put on these film sheets. It was understood that attempts were being made to develop a similar code for the biological sciences also.

65 Classification for Use with Automatic Devices

In the application of automatic devices in scientific documentation, the problem of classification is a very important one. Almost all the institutions I visited have developed their own scheme of classification. Every system has no doubt certain advantages, but they are not developed to cover all fields of scientific activity, and an all round acceptable system is not available.

Attempts were made by the Statistics Department, TNO, the Hague, to punch Hollerith type cards according to the U. D. C. classification number, but it was found that retrospective searches were not very easy to make. The difficulty probably arose from the non-uniformity of the length of the numbers punched, which might sometimes be in three digits and sometimes two, and were generally interspersed with comma, stroke, dash, full-stop, and colon. It was felt that, if the machine was to work satisfactorily, the system of classification should provide a code consisting of a uniform number of digits or letters of the alphabet in each column.

The International Advisory Committee on Documentation in Natural Sciences, which is functioning under Unesco, has also given consideration to this problem and at its last meeting in February, 1954 it recommended that a working paper be prepared reviewing the position in this field and suggesting such measures as may be considered necessary to remedy the situation.

66 Observations on the Use of Automatic Devices

In considering the question of large scale use of automatic devices for organising documentation services the following points are important: 1) the volume of scientific data which have to be studied, classified, coded and punched before the machine can be used; 2) the volume of work in retrospective searches and its dissemination; 3) the field of activity, whether it is narrow, specialised or general.

In the case of a Documentation Centre covering all branches of activity, the number of cards to be punched will be enormous and unless the volume of work on retrospective searches keeps the selecting machines fully employed, it may not be economical to spend time and labour on coding all the information.

On the other hand, if the Centre were dealing with a limited field of activity, such as the Department of the Bureau of Agriculture publishing the Plant Breeding Abstracts, then the question resolves itself into a rather simpler problem of economics, namely the salaries of the staff required for non-machine retrospective searches as against the cost of a reasonably priced machine which would rapidly carry out the search.

INTERNATIONAL CO-OPERATION FOR SCIENTIFIC REPORTING

The rate at which scientific reporting is progressing, and the importance of knowing in a given region what is published in another part of the world at the earliest possible opportunity, have both increased rapidly in modern times. If scientific reporting of world literature were left, as it is now being left, to a limited number of internationally recognised abstracting journals, such as the Physics Abstracts, Chemical Abstracts, Index Medicus, and Biological Abstracts, then it seems desirable that some machinery should function effectively to reduce the average time lag between the publication of a communication and the inclusion of its abstract in an international abstracting journal. Modern documentation techniques offer two possibilities in this direction.

i) microfilming of abstracts, classified according to a recognised scheme, and their onward transmission by air to the internationally recognised abstracting journals. The data could be photographically enlarged.

ii) punching the data on cards, according to an internationally agreed scheme, and transmission by air freight to the appropriate abstracting journal. The data could be decoded by tabulating machines.

Either of these arrangements can work effectively, provided active co-operation is established between specified national organisations for compiling abstracts of papers published in their countries, and international abstracting organisations.

At the present tempo of scientific research, I feel that the problem of quick dissemination of information, although an old one, needs reconsideration by the appropriate international organisations, especially in view of the advances made in documentation techniques. The versatility and possibilities of adapting automatic accounting machines to documentation techniques alone is a promising field of study.